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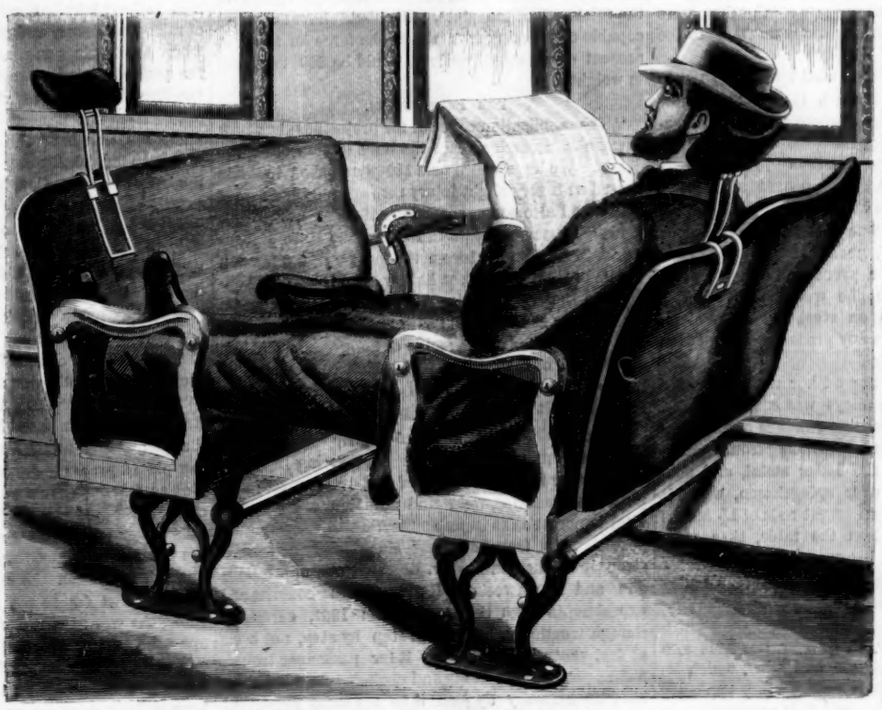
Improved Head-rest.

Riding upon the rail is very fatiguing, especially if one has to take a long journey. After a few miles the scenery, what one can see of it, becomes monotonous, and fences merging into white lines, trees bending and whisking their branches in the wind, houses, cattle, men, and the thousand-and one objects—animate and inanimate—make one giddy and fain to seek refuge in closing the eyes. As cars are ordinarily built the seats are too low behind to afford any support to the head, and after vainly leaning back or frantically bolting forward, the weary traveler, is obliged to relinquish the idea of getting even "forty winks," and is compelled to grin and bear the jolting and concussion as well as he can.

That is ordinarily; now he may provide himself against the evils and annoyances above mentioned by the use of the head-rest shown in this engraving. A distinguished individual of literary tastes and luxurious habits is represented enjoying both with great satisfaction.



PHELPS'S TRAVELERS' HEAD-REST.

The object is to provide the railroad traveler with an easy and ready mode of procuring rest or sleep while riding in railway cars, either day or night. With some propriety it might be called a portable pocket berth, as it is susceptible of being carried about the person or within any common traveling satchel or bag, and may be attached to, or detached from, the back of any ordinary car seat, and raised or depressed to any desired position for the head in a moment of time. With it one may pass a day's or a week's ride in any railway car without experiencing any thing like the usual fatigue.

The rest is externally light, weighing but a few ounces, is made of the finest spring steel highly polished, and is upholstered in a handsome manner in conformity with first-class cars.

When it is considered that one will last a lite time, and that the ordinary fatigue from riding in railroad cars is reduced to comfort and pleasure by their use, the portable rest will be esteemed and approved of by the public generally.

This invention was patented on July 4, 1865, by W. R. Phelps, through the Scientific American Patent Agency; for further information address him at No. 34 Barclay street, New York.

Savings Banks in England.

Charles Ryland & Son's *Iron Trade Circular* (London) says:—

"It is indeed a noticeable fact that the amount deposited and invested in savings banks and friendly societies, now reaches ninety-three millions and upward of a tenth, an amount equal to about one-eighth of the national debt. As this sum is invariably invested in consols, and is steadily on the increase, it is not difficult to estimate the effect it must have in steadying the price of the funds, and replacing, by a Government enforced investment, the withdrawals made by independent holders, who retire their money from securities paying so small an interest, to others which they regard as equally secure, while they give a larger return.

Large Profits of the London Underground Railroads.

The last number of the London *Engineer* makes the following statements in regard to the Metropolitan Railway:—

"Among our railway systems the Metropolitan is *sui generis*. It is unique in its mode of construction, in the district it serves, and in its working. At the top of the list in mileage traffic receipts, and, we may almost add, in the value of its shares. It is peculiar, inasmuch as the whole of the line is constructed in or under the metropolis, many portions of it passing under densely-populated districts and busy thoroughfares. The number of passengers it conveys is perfectly enormous. In the last half year the persons carried on the Metropolitan were 7,462,823, that is, two-and-a-half times the population of London. The mere increase in the number of passengers conveyed in the last, as compared with the preceding, half year, was equal to the united population of a score of the next largest cities and towns in England, including Manchester, Liverpool, Birmingham, Newcastle, etc.

"The third-class passengers, in the number stated, were 5,110,823, or nearly 69 per cent of the whole. The total capital of the company in ordinary and preference shares and debentures, amounts to £2,800,000, but will amount, it is expected, to £5,400,000, when the whole system is completed. As to the soundness of the scheme and its profitable character, it may be mentioned that in the first year of its existence the shares were at 50 per cent discount, whereas they have been sold at upward of 40 per cent premium. The dividend for the last half year was at the rate of 7 per cent per annum. The revenue has risen from £15,000 for the half year ending December, 1863, to £41,000 for the half year ending June, 1865. The traffic per mile presents an extraordinary contrast with that of most other railway companies. The Metropolitan receipts per mile per week are as high as £703. The nearest approach to this is by some of the lines which have Metropolitan and suburban traffic, but all of these fall far short of it. The Blackwall line reaches about £394 per mile per week, and the North London £373, whereas the great companies having London termini, and other large companies in other parts of the country, have traffics which only yield receipts ranging fron £60 to £160 per mile per week. In Whit week last the Metropolitan carried 370,843 passengers, and in one day alone—the Monday of that week—it carried 83,440 and, as a result of the perfect system of signaling adopted on that line, without loss of life or casualty to a single passenger. The trains are now very frequent, but it is expected that when the system is completed, they will be run each way at intervals of two minutes, which may be done with perfect safety, inasmuch as no train is allowed to pass from one station to another until the signal has been received that the line is clear between the stations. The Metropolitan forms an important part of what is popularly known as the 'inner circle,' which gives access by railway to all directions in general, and leads to no place in particular. This 'circle,' belt, or link, is far from being a true circle. On the map it has somewhat of the appearance of the trunk and head of a 'porker,' or a hippopotamus with an unduly elongated snout."

HENRY BESSEMER ON HIS PROCESS OF MAKING STEEL.

At the recent meeting of the British Association, at Cheltenham, Eng., Mr. Henry Bessemer read a long paper on the manufacture of steel by his process of blowing air through molten cast iron to burn out the carbon—a process which has been repeatedly illustrated and described in the SCIENTIFIC AMERICAN, and which has been recently introduced into this country by Messrs. Winslow, Griswold & Holley, of Troy, N. Y. It will be remembered that Mr. Mushet claimed to be the discoverer of that modification in the Bessemer process which made it a practical industry—the introduction of manganese. On this point Mr. Bessemer makes the following statenent:—

THE AUTHOR OF THE MANGANESE IMPROVEMENT.

In the old Sheffield process the original quality of the Swedish charcoal iron employed governs the quality of the cast steel made; consequently, £36 per tun is freely given for the high class Danamora iron, while other brands of Swedish charcoal iron may be

bought for £15. In either case these are expensive raw materials for the cast-steel maker.

"In 1839 the trade of Sheffield received an enormous impulse from the invention of Josiah Marshall Heath, who patented in this country the employment of metallic manganese, or, as he called it, 'carburet of manganese.' The addition of a small quantity of this metal, say from one-half to one per cent, rendered the inferior coke-making irons of this country available for making cast steel; it removed from these inferior qualities of iron their red-shortness, and conferred on the cast steel so made the property of welding and working soundly under the hammer. This invention was of great importance to the town of Sheffield, where its value was at once appreciated. Mr. Heath, supposing himself secure in his patent told his licensees that if they put oxide of manganese and coal tar or other carbonaceous matter into their crucibles along with the blister steel, that it would do as well, and be much cheaper than the carburet of manganese he was selling them; in effect it was the same thing, for before the steel was melted the carbon present reduced the oxide of manganese to the metallic state, so that his patent carburet of manganese was formed in the crucible in readiness to unite with the steel as soon as it became perfectly fused. But the law decided that this was not Heath's patent, and so the good people of Sheffield, after many years of litigation, were allowed to use it without any remuneration to the inventor.

"Manganese has now been used for many years in every cast-steel works in Europe. It matters not how cast steel is made, since manganese added to it necessarily produces the same beneficial changes; no one better appreciated this fact than the unfortunate Mr. Heath, as evidenced by his patent of 1839, in which he declares that his invention consists in 'the use of carburet of manganese in any process whereby iron is converted into cast steel.' Had Heath seen in his own day the Bessemer process in operation, he could not have said more; he well knew the effect produced by manganese on steel, and, therefore, claimed its employment in any process whereby iron is converted into cast steel.

"At the suggestion of the author a work for the production of manganese alloys was erected by Mr. Henderson, at Glasgow, who now makes a very pure alloy of iron and manganese, containing from twenty-five to thirty per cent of the latter metal, and possessing many advantages over spiegeleisen, which it will doubtless replace. Two bright rods of $1\frac{7}{8}$ inches in diameter will be found on the table, they were folded up cold under the hammer. This extremely tough metal is made by using Mr. Henderson's alloy in lieu of spiegeleisen, which is incapable of making steel of such a quality.

"A Prussian gentleman, M. Preiger, has been also successful in manufacturing a new alloy, which he calls ferro-manganese, consisting of sixty to eighty per cent of metallic manganese. It is extremely useful in making malleable iron by the Bessemer process, in which spiegeleisen cannot be employed on account of the large proportion of carbon it contains."

We make also the following extracts from his paper:—

USE OF BESSEMER STEEL IN SHIP BUILDING.

"The Bessemer cast steel made for ships' plates by the several eminent firms now engaged in that manufacture is of an extremely tough and ductile quality, while it possesses a degree of strength about double that of the inferior kind of iron plates usually employed in ship building, hence it is found that a much less weight of material may be employed, and at the same time a greater degree of strength may be given to all parts subjected to heavy strains.

"Most prominent among the builders of steel ships is the firm of Jones, Quiggin & Co., of Liverpool, who have now constructed no less than 31,510 tuns of shipping, wholly or partially built of steel. Of these, thirty-eight vessels are propelled by steam with an aggregate of 5,910 horse-power, besides this the principal masts and spars of eighteen sailing ships have been made by them wholly of steel.

"Vessels of a large size, constructed to class A A twelve years at Lloyd's, weigh, when built of iron, about 12 cwt. per tun measurement; whereas similar vessels built of steel weigh only about 7 cwt. per tun measurement; thus an iron ship to take first class at Lloyd's for 1,000 tuns measurement, would weigh 250 tuns more than a steel one of the same class. Such a vessel could, therefore, take 250 tuns, or 25 per cent more freight at the same cost, or could avail herself of the difference of immersion to leave or enter port when the tide would not permit an iron vessel to do so: As a steamer she would carry 250 tuns more of coal, and thus be enabled to lengthen her voyage or take her coal for the return trip. The two steam paddle-wheel steamers launched at Liverpool by Messrs. Jones & Co., on the 13th ult., for Dublin and Liverpool service, will draw from 3 to 4 feet less water than iron steamers built on the same lines, and being thus enabled to leave port at all states of the tide, will not require a tidal train in connection with them. If the employment of steel for the construction of merchant vessels is found to be so important, how much more so is it for ships of war. Some of the larger class of armor-plated vessels require 6,000 tuns of iron for their construction, and an addition of 1,800 tuns in the shape of $4\frac{1}{2}$-inch armor plates. Now, if the frames and inner skin of such a vessel were constructed of steel it would be much stronger even if reduced to 4,000 tuns in weight; this would admit of 9-inch armor plates being used in lieu of $4\frac{1}{2}$ inch, and would still leave the vessel 200 tuns lighter than the present ones, and hence, as the resistance of the armor to impact is as the square of the thickness of the plate, we should have a vessel capable of resisting four times the force of those at present constructed, while it would be 200 tuns less in weight."

FOR PROJECTILES.

"The application of steel for projectiles has now become a necessity since the introduction of armor plates. We have before us a 110-pound shot, that has passed with very slight injury through a 5-inch armor plate, and also some specimens of bent angle iron, made of Bessemer iron, and rolled at the Millwall Ironworks in London, and from the same works a portion of one of Hughes's patent hollow steel beams for supporting the armor plating in course of construction for the forts at Cronstadt; both are interesting examples of what the rolling mills of the present day can effect, and of the facility with which cast malleable iron and cast steel admit of being worked into the most difficult forms."

FOR AXLES AND TIRES.

"There is no department in engineering in which the peculiar toughness of steel and its strength and power of resisting wear and abrasion are of such vital importance as in its application to railway purposes. This fact had long since impressed itself strongly on the mind of Mr. Ramsbottom, of the London and Northwestern Railway, who commenced experiments with this material in 1861, carefully, though trustingly, he tried it step by step, not even at first venturing to employ it for passenger trains, but as proofs of its safety and economy crowded upon him, he carefully applied it to the most important parts of passenger engines, and even to the manufacture of the formidable engine cranks (at that time intrusted only to the most eminent iron-making firms in the kingdom), these iron cranks are now being replaced by steel ones forged from a single mass. One of these steel cranks, manufactured at the new steel works at Crewe, has been obligingly lent by Mr. Ramsbottom as an illustration of the use of steel for this purpose; that gentleman has also taken out of use a plain steel axle that has run a distance of 112,516 miles, and now exhibits very slight signs of wear.

"The tires of wheels, on which so much of the public safety depends, were then tried, but the exact amount of difference between the endurance of wrought iron and Bessemer steel for this purpose is not yet ascertained, as none of these steel tires are yet worn out; but enough has been shown to prove the advantage of entirely replacing iron by steel for this purpose.

"In order to show how a steel tire will resist the most violent attempts to produce fracture, an example is given of a steel tire manufactured by Messrs. Bessemer & Co., of Sheffield; it was placed on edge under a six-tun steam hammer, and subjected to a series of powerful blows until it assumed its present form, that of a figure of eight, a degree of violence immensely more than it could ever be subjected to in practice. These tires are made without weld or joint, by forging them from a square ingot partly under the improved plan invented by Mr. Ramsbottom, and partly by an improved mode of flanging and rolling, invented by Mr. Allen, of the Bessemer Steel Works, Sheffield.

"So important were found to be the advantages of employing cast steel as a substitute for wrought iron at the works of the London and Northwestern Railway Company, that the directors, acting under the advice of their able engineer, determined on building large steel works at Crewe, which is now in active and successful operation. In the design and arrangement of their plant for working up the steel several important improvements have been introduced by Mr. Ramsbottom, among others his duplex hammer, which strikes a bloom on both sides of the ingot at once, in a horizontal direction, and thus renders unnecessary the enormous foundations required for ordinary hammers. Here, also, he has put up his improved rolling mill for rolling blooms of large size, the enormous machine being reversed with the greatest rapidity and ease by the attendant, without any shock or concussion whatever."

FOR RAILROAD RAILS.

"While matters were thus steadily progressing in the engine department of the company, the engineer of the permanent way, Mr. Woodhouse, took in hand a thorough investigation of a no less important problem, viz., the substitution of cast steel for wrought-iron railway bars. For this purpose some 500 tuns of rails were made, and put down at various stations where the traffic was considerable, so as to arrive, at the earliest period, at a true comparison of the respective endurance of wrought iron and cast-steel rails. It will be unnecessary here to enter into the numerous details of the extensive series of experiments systematically carried out by Mr. Woodhouse; the trials made at Camden will suffice to show the extraordinary endurance of steel rails. It is supposed that there is not one spot on any railway in Europe where the amount of traffic equals that at the Chalk-farm bridge at Camden Town. At this spot there is a narrow throat in the line, from which converges the whole system of rails employed at the London termini of this great railway. Here all passengers, goods, and coal traffic have to pass; here, also, the making up of trains and shunting of carriages is continually going on. At this particular spot two steel rails were fixed on May 2, 1862, on the side of the line, and two new iron rails were on the same day placed precisely opposite to them, so that no engine or carriage could pass over the iron rails without passing over the steel ones also. When the iron rails became too much worn to be any longer safe for the passage of trains, they were turned the other way upward, and when the second side of the iron rails was worn as far as the safety of the traffic would allow, the worn-out rail was replaced by a new iron one—the same process being repeated as often as was found necessary. Thus we find, at the date of the last report on March 1, 1865, that seven rails had been entirely worn out on both faces. Since then another rail has been worn out up to July, making sixteen faces worn out, the seventeenth face being in use on August 22d, when the steel rail that had been placed opposite to them was taken up in the presence of the writer, and, by the kind permission of Mr. Woodhouse, now lies on the table before the meeting. The first face of the rail only has been used, and this is now become much thinner than it was originally, but, in the opinion of the plate layers is still capable of wearing out another half-dozen faces. Taking its resisting powers at three more faces only, it will show an endurance of twenty to one in favor of steel.

"Mr. Woodhouse has ascertained, by careful and continued testing for twenty-four hours at a time, that, an average of 8,082 engine tenders or carriages pass over the steel rails every twenty-four hours, equal to 16,164 wheels every day for 1,207 days, making a total of 9,754,974 wheels passed over the rail. Subject to this excessive wear the rail seems to have been reduced $7\frac{1}{2}$ lbs. per yard, hence, for every grain in weight of steel lost by abrasion, no less than 371 wheels had to pass over it. Another steel rail, put down also in May, 1862, at a place much less subject to wear, has had four faces of iron rails worn out opposite to it, and still appears as if very little used; this rail is also placed on the table. An iron rail wears out by the giving way at various parts of the imperfectly welded mass, and not by the gradual loss of particles of metal, as in the case of the steel rail,

which no amount of wear and tear seems capable of disjointing. It must be borne in mind that this enormous endurance of cast steel is not owing to its hardness or brittleness, as some have supposed, for, in fact, Bessemer steel possesses an extreme degree of toughness. There is before the meeting an example of this fact: one of the same quality of steel rails having been attached at one end of the main driving shaft of a steam engine so as to twist it while cold into a long spiral, measuring 9 feet in length at top and bottom, and only 6 feet if measured along the center of the web. A single glance at this spiral rail will, it is presumed, dispel any idea of brittleness that may have been entertained."

EXTENT OF THE MANUFACTURE.

"In conclusion, it may be remarked that cast steel is now being used as a substitute for iron to a great and rapidly increasing extent.

"The jury reports of the International Exhibition of 1851 show that the entire production of steel of all kinds in Sheffield was, at that period, 35,000 tuns annually, of which about 18,000 tuns were cast steel, equal to 346 tuns per week; the few other small cast steel works in the country would probably bring up this quantity to 400 tuns per week as the entire production of cast steel in Great Britain. The jury report also states that an ingot of steel, called the 'monster ingot,' weighing 24 cwt., was exhibited by Messrs. Turton, and was supposed to be the largest mass of steel ever manufactured in England. Since that date a great change has been made, for the largest Bessemer apparatus at present erected in Sheffield, at the works of Messrs John Brown &Co., is capable of producing with ease every four hours a mass of cast steel weighing 24 tuns, being twenty times larger than the 'monster ingot' of 1851.

"There are now seventeen extensive Bessemer steel works in Great Britain. At the works of the Barrow Steel Company 1,200 tuns per week of finished steel can easily be turned out, and when their new converting house, containing twelve more five-tun converters, is completed, these magnificent works will be capable of producing weekly from 2,000 to 2,400 tuns of cast steel. There are at present erected and in course of erection in England no less than sixty converting vessels, each capable of producing from three to ten tuns at a single charge. When in regular operation these vessels are capable of producing fully 6,000 tuns of steel weekly, or equal to fifteen times the entire production of cast steel in Great Britain before the introduction of the Bessemer process. The average selling price of this steel is at least £20 per tun below the average price at which cast steel was sold at the period mentioned. With the present means of production, therefore, a saving of no less than £6,240,000 per annum may be effected in Great Britain alone even in this infant state of the Bessemer steel manufacture."

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list:—

Reversing Gear for Steam Engines.—The object of this invention is to change the motion of the slide valve at the end of each stroke of the piston by the action of parts which are arranged in the interior of the cylinder and operated by the piston or parts attached to the same. This object is effected by connecting the slide valve to a rod which connects two pistons working in cylinders that are formed by the ends of the valve chest, and the outer ends of which connect by suitable channels with chambers which are situated in the cylinder heads and communicate with the cylinder through openings that are closed by spring valves. Whenever the piston approaches one of the ends of its stroke it strikes the stem of one of the spring valves, and by opening it allows the steam contained in the end of the supplementary cylinder to escape, and thereby the equilibrium at both ends of the small pistons connecting with the slide valve is disturbed, and the slide valve is changed automatically. Small channels passing through said pistons allow the steam to pass into the supplementary cylinders, but these channels are so small in proportion to the channels leading from the supplementary cylinders to the chambers in the cylinder heads, that if one of the spring valves is opened, the steam from the supplementary cylinder escapes much quicker than it can be replenished through the small channel, and thus the equilibrium is disturbed and the slide valve changed as above stated. A. S. Cameron, corner of Second avenue and Twenty-second street, New York, is the inventor.

Device for Extracting Stumps and Elevating and Conveying Heavy Bodies.—This invention relates to the application of hydraulic pressure to a carriage for elevating heavy bodies, extracting stumps, raising stones, etc., and conveying them, when elevated and retained in a suspended state, to the place designed for them. The invention consists in the employment or use of an hydraulic apparatus similar to that used in the hydraulic press, placed upon a strongly-built carriage, and arranged with a water tank, and having the axles of the carriage provided with screw jacks—all arranged in such a manner that the desired work may be performed with but little labor, and with great facility. E. C. Haserick, Lake Village, N. H., is the inventor.

Drill Coupling.—This invention consists in a new method of making joints or couplings by which drilling tools are fastened on their rods and the sections of the rods coupled to each other, whereby the joint is made with facility and without injury to the screw thread or to the joint itself. One of the most serious difficulties now experienced in drilling an oil well is from the constant tendency in the couplings of the drill rod to become unscrewed; and, since there are four or more in every set of tools, the hindrances from this cause are frequent. Another difficulty arises from the breaking off of the male screw at its shoulder, caused by the excessive wrenching to which it is subjected when the joint is put together. Another difficulty is the stripping of the threads of the screw, by reason of the violent jar when the drill gives its stroke. The present manner of "wrenching on" the joints or couplings of drill rods and their tools is about as follows:—Two iron wrenches, several feet long, are used, the lower one resting against the ground or some fixed body, and the upper one being turned as tight as possible by hand, when two men, with a wooden lever about six or eight feet long, surge with all their might against the wrench. This throws an immense strain upon the threads, creating new bearings and angles, and causing them to become stripped and broken. This invention is meant to preserve the joints and couplings aforesaid, and to provide a more certain connection, and one which costs less labor to make secure. Job B. Stockton, Oil City, Pa., is the inventor.

Button-hole Sewing Machine.—This invention relates to a button-hole sewing machine which imitates, as near as possible, the hand stitch generally employed in making button-holes. One needle is employed which passes down alternately through the cloth near the edge of the button-hole, and then through the hole itself. Two threads are employed, one of which is carried by the eye-pointed needle and the other by a circular shuttle or bobbin situated in the interior of an oscillating hook. The gimp which is used to strengthen the edge of the button-hole, is carried by a bobbin which lies in the cavity of a revolving hook. The oscillating hook which carries the lower thread serves to take up the loops of the needle thread, as the same drops from the revolving hook and passes the same over the bobbin carrying the lower thread, which, passing through said loops in a direction opposite to the gimp, causes them to twist and to produce a stitch similar to that employed in making button holes by hand. The position of the cloth on the cloth plate is governed by a feeder which has a triple motion, viz., a vertical motion in the direction transversely to the cloth plate, or in the direction in which the cloth is fed while sewing; a similar motion in a direction at right angles to the latter motion, and a rotating motion. The first motion serves to feed the cloth in the ordinary manner; the second imparts to the cloth a lateral motion, causing the needle to pass down through the hole instead of through the cloth, and the third or revolving motion is employed to govern the motion of the cloth in sewing round the eye of the button hole. While sewing the straight edges of the button-hole the circular motion of the feeder is thrown out of gear. The various motions of the feeder are adjustable so that they can be accommodated to button-holes of different sizes. If desired, the sewing machine can also be employed for ordinary or plain sewing. Emil Cajar, of No. 298 Hudson street, New York, is the inventor.

Spinning Jack.—This invention relates to an apparatus the object of which is to put friction upon the driving pulley of the jack by sliding the bolt partially upon it from the driver pulley and thereby to assist the spinner in winding the yarn upon the bobbins. This apparatus consists of a bell-crank cam lever, one arm of which is hinged to a longitudinally sliding rod which is subjected to the action of a spring, and the motion of which is governed by a regulating screw, in combination with the belt shipper and with a catch and rod acting on said catch, when the faller or copping wire is applied in such a manner that, whenever the spinner applies the faller to the threads, the catch is sprung, and by the action of the spring rod the belt is shifted from the loose or the fast pulley, more or less, according to the position of the regulating screw; and when the carriage is pushed home it strikes the bell-crank cam lever and carries the spring rod back, thereby shifting the belt back upon the loose pulley and allowing the catch to drop behind the spring rod, ready for the next succeeding motion of the carriage. Ezra Dews, South Britain, Conn., is the inventor.

Self-acting Brake for Horse-powers.—This invention consists in having the bearings of the driving shaft of a horse-power arranged in such a manner that they will slide in a direction transversely with the shaft, and having springs, or their equivalents, connected with said bearings in such a mannner that they will have a tendency to press the band wheel, which is the driving shaft, in contact with the break when the band is off from said wheel—the band, when on the wheel, keeping, by its tension, the wheel free from the brake, so that at any time when the band is cast off from the wheel the spring will throw the wheel in contact with the brake. William F. Rundell, Genoa, N. Y., is the inventor.

Apparatus for Drying Straw Boards.—This invention has for its object to dry straw boards and other articles of similar character. Straw boards have hitherto been dried by passing them in their green state around heated cylinders by means of strong canvas bands, which are made partly to encompass the cylinders. This invention consists in the use of stationary steam chests, against whose surfaces the articles to be dried are held by means of hinged pressers, consisting of frames whose bodies are composed of cloth or other suitable material, which shall be of an open texture, to admit the passage of vapor through it. William H. Severson, Cohoes, N. Y., is the inventor.

Fire-arm.—This invention consists in forming the breech-piece or cylinder of a fire-arm in two parts or sections, so arranged as to be opened or removed from each other for the insertion of metallic cartridges therein, or the removal of the waste cases therefrom; and when a revolving breech cylinder is used, so constructed and connected as to revolve together and as one piece—the metallic cartridges, when inserted within the chamber or chambers of the breech, extending across from one section to the other, with their fulminating rims in and between the contiguous ends of the same, and the striking hammer of the fire-arm being properly constructed and arranged to discharge the cartridges, as in ordinary fire-arms. Silas Crispin, No. 45 Worth street, New York City, is the inventor.

WORTH IMITATING.—The New Bedford and Taunton Railroad has an arrangement for preventing brakemen being knocked off the tops of the cars by bridges while riding backward. About thirty rods distant from every bridge crossing is a bar or joist twenty feet above the track, from which a number of laths or similar small strips of wood are suspended by short cords, hanging within three or four feet of the car roofs. Persons standing on the cars cannot pass these sticks without striking some of them, and their attention is thus called to the fact that they are rapidly approaching a bridge.

ONE good Havana cigar is found by Dr. Richardson to yield, when its smoke is condensed, a sufficient amount of poisonous matter to induce active convulsions in a rabbit, and six pipes of common shag tobacco will yield sufficient poison to destroy a rabbit in three minutes.

THE FAIR OF THE AMERICAN INSTITUTE.

We continue our notices of the Fair in this issue. It will remain open for some days longer, until Oct. 19th. We have already given the principal novelties attention, and devoted a large portion of our space to the interests of the exhibitors, and have not intentionally overlooked any object of general interest.

HARD-RUBBER COLLARS.

Steel collars have been in vogue for some time, and are much liked by some. Of late, hard-rubber manufacturers have introduced a new style of goods for mourning use, consisting of ties, collars and cuffs, made of hard rubber. They look like silk in finish, and are, of course, capable of great variety in ornamentation.

BREAD AND MEAT CUTTER.

This machine was invented in response to a call for such a one published in our correspondence. It is a very substantial affair, and is quite the same in construction as a circular saw without teeth. The knife is circular and is driven by a belt and treadle, and there is a sliding table which can be gaged to cut to any desired thickness. John Burgum, Concord, N. H.

AMERICAN NEEDLE COTTON GIN.

This is a new kind of cotton gin, wherein the cotton is cleaned by a series of needles on endless belts, instead of by saws, as usual. H. V. Scattergood, Albany, N. Y.

BUTTON-HOLE MACHINES.

The button-hole machines seem to have reached great perfection. The Union Button-hole Machine Co., of Boston, Mass., exhibit one of their machines in operation doing perfect work. In this machine the needle skips from side to side of the braid around the button-hole, at every stitch, and works around it at the ends with great accuracy and elegance of execution. It makes fifty button-holes an hour.

Messrs. Wheeler & Wilson exhibit one of their well-known button-hole machines also; it is well worth looking at.

SHINGLE-CUTTING MACHINE.

A few years ago machines were introduced for making shingles very rapidly by paring them from a block of wood, the block having previously been subjected to the action of hot steam for four or five hours. The shingles which were cut by this process, on exposure to the sun, developed fine cracks or splits, and, in consequence, they went generally out of use. Mr. John D. Chism, of No. 684 Sixth avenue, New York, has on exhibition at the Fair a machine which he claims overcomes the difficulty. He argues that the cracking of pared shingles was the result of a wabbling motion of the cutting blade, owing to the frame of the machine being made of wood, and contends that, by making the frame of his machine of iron, he gets a perfectly steady motion to his knife, and produces a perfect shingle. His machine has also a novel and very positive feed motion for the block.

A COMPACT STEAM ENGINE.

Mr. George B. Brayton, of No. 84 Washington street, Boston, exhibits a steam engine of six horse-power, which is one of the most compact machines, including engine and boiler, of any that we have ever seen of this power. The engine is an oscillator, taking and discharging steam at the trunnions, the novelty being in the boiler. A rectangular cast-iron chest has the fire in its lower part. Directly over the fire are a series of one inch and a half wrought-iron tubes, slightly inclined, with their lower ends closed by screw plugs, and their opposite ends opening into a series of cast-iron chambers, which extend longitudinally across the chest above the pipes. These chambers are divided by cross webs, cast with them, into cells four inches wide and thirteen inches deep, the openings from one cell to another being only one inch and a half in diameter. The object of this arrangement is to so obstruct the communication between the several parts of the boiler, that, in case of a rupture, no large quantity of the hot water could be so suddenly thrown into the air as to cause a violent explosion. The manifest objection to cast iron for boilers is, that the requisite thickness of the walls obstructs the transmission of heat from the fire to the water. The exhibitors of this engine claim, however, to get a horse-power by the expenditure of two and a half pounds of coal per hour—a very good result for so small an engine.

HASH MACHINE.

Hash is a standing joke with a certain class in the community who are always ready to make fun of any thing. Nevertheless, hash is not to be despised when you know what it is composed of, and who has made it. It is quite tedious to chop up a quantity of meat, and therefore machines have been provided to do it by power. All that is necessary is to put the meat in a case containing a number of revolving knives; then turn a handle and the hash is made. All the meat is minced before it issues from the further end, where there is a spout to allow it to discharge. These machines are easily worked and cleaned. Miles Manufacturing Co., No. 59 Lewis street, New York.

TRUE'S POTATO PLANTER.

This machine is on exhibition at the Fair, and is highly approved of by those who have used it; it will do the work of ten men, and as perfectly as it can be done by hand. The inventor has been many years engaged upon it.

SALES OF PATENTS.

We noticed in our last week's issue, that a number of patents had recently been sold for quite large sums. The clergyman alluded to who had been offered $50,000 for his United States patent, informs us that he has since consummated a sale of it for $200,000. The invention is on a valve for a steam engine, and is illustrated in No. 7, present volume, SCIENTIFIC AMERICAN.

One half of the patent on a tobacco pipe granted to Edwin Hoyt, on the 26th ult., has been sold, we are informed, for $2,500.

The inventor of a very novel music stand, for which a patent was recently solicited through this office, and allowed, but which is not yet issued, says he has been offered $3,000 for his invention, but refused it, for the reason that he had orders for all he can make during the next twelve months.

And we know of a still larger number of patentees less fortunate in finding purchasers, but abounding in faith that their inventions will be appreciated some time, when a fortune will crown their patient waiting.

We would not encourage all inventors to expect that they may realize a fortune without further effort than obtaining their patents; but we believe, where the invention is a good one, and the patent is properly secured, and where the same, or even less, energy is expended in making sales that the owner would exert at his trade, he would usually realize far better pecuniary results.

THE COOPER UNION NIGHT SCHOOLS.

It is impossible to overestimate the benefit mechanics, clerks, and young men of all professions, have received from the Cooper Union Schools. While others, who have been fortunate enough in early years to procure a liberal education, are toiling up the steeps of fame, hard after them comes the artisan and the sturdy workers, determined to dispute the possession of wealth and renown; for both of these distinctions are possible with the possession of an education. It will be seen from the programme published below that, by the munificence of Mr. Cooper, a splendid course of lectures can be heard at the Institute without money and without price. These lectures are in connection with the schools, where competent teachers are employed to instruct persons in all branches of education. The programme of the second week's lectures before the classes, by Prof. Chas. S. Stone, is:—Monday, Oct. 16, Natural Philosophy—Motion and its Laws; Tuesday, Oct. 17, Elementary Chemistry—Chemical Affinity and the Laws of Combination; Wednesday, Oct. 18, Analytical Chemistry—The Alkaline Group; Thursday, Oct. 19, Elementary Chemistry—The Chemical Nomenclature and Symbols; Friday, Oct. 20, Natural Philosophy—Gravity and Its Laws.

The Lectures are changed through the winter, and are open to the public, but visitors are not admitted after a quarter before eight o'clock.

A FIELD of wheat buried under an avalanche for twenty-five years proceeded on its growth, etc., as soon as the snow had melted.

FOREIGN SUMMARY.

A VISIT to James Watt's workshop is thus graphically described by an Edinburgh gentleman attending the British Association:—We were admitted into his workroom—a garret at the top of the house. It appears he had a scolding wife, who didn't like the messes and noises he made, so he was sent to the attic. This room is exactly as Watt left it. The very ashes are still in the grate; his little lathe has a bit of unfinished work in it; tools lie about; books and drawings are in old drawers, and strewed here and there. It is a miserable place. Only four of us could get in it at one time. In fact, the daughter of the house who went with us had to tuck herself up into all manner of shapes to prevent her crinoline sweeping all the letters into the corners. The house is a very good one, and Watt was rich when he died there; but it's clear his wife kept him and his little workroom in the background. This room has only been recently opened. By the will of Watt's son it was ordered to be left forever as the old man left it when he last went out at its door. It was not looked into for more than thirty years.

SEVERAL inventions have lately been patented for the prevention of accidents in coal and other mines, but perhaps the most simple and complete apparatus is that of Messrs. Denton and Whittaker, which consists in the application to the cages of strong iron springs, which catch the woodwork on every stoppage of the cages, and effectually prevent them from slipping. In case of an accident such as that which occurred at Wigan last week by the breakage of the rope, this apparatus would at once have stopped the cage, and prevented the great loss of life which took place. The invention also provides against accidents from overwinding, a slipcatch giving way when the cage has reached the required hight. The patent has been successfully tried on the Ardsley colliery of Messrs. Firth, Donisthorpe & Co.

THE Paris correspondent of the *Chemical News* states that an important experiment has been made by M. Duchemin during a holiday at the seaside. He made a small cork buoy, and fixed to it a disk of charcoal containing a small plate of zinc. He then threw the buoy into the sea, and connected it with copper wires to an electric alarm on the shore. The alarm instantly began to ring, and has gone on ringing ever since, and, it is added, that sparks may be drawn between the two ends of the wires. Thus the ocean seems to be a powerful and inexhaustible source of electricity, and the small experiment of M. Duchemin may lead to most important results.

THE SIXTH SENSE.—Dr. Hughes Bennett, Professor in Edinburgh University, lately read a paper before the British Association of Science, wherein he announced that the tendency of modern physiology was to ascribe to man a sixth sense. If there be placed before a man two small tubes, the one of lead and the other of wood, both gilded over so as to look exactly alike, and both of the same temperature, not one of the five senses could tell the man which is lead and which is wood. He could tell this only by lifting them, and this sense of weight was likely to be recognized as a sixth sense.

THE Rev. W. R. Dawes concludes that the ruddy tint of the planet Mars does not arise from any peculiarity of the color of its atmosphere, as the redness is most apparent in the center where the atmosphere is thinnest, and it is suggested that it arises from the color of the soil.

SAYS Menclus:—"If I am treated rudely, let me examine into the cause, and if I cannot discover any sort of impropriety in my own conduct, I may disregard the rudeness, and consider him who displays it as no better than a brute, and why should the conduct of a brute disturb me?"

IN the year 1325 a vessel is recorded to have brought corn from France to Newcastle and to have returned laden with coal.

TO CARRY on the coasting trade in coals to London, 10,000 tuns of gravel are weekly supplied in the Thames for return ballast.

ONE-THIRD of the coal used in France is imported from England, Belgium and Prussia.

POTATOES grow at Quito at an elevation of 10,000 feet above the sea, but olives not above 1,250 feet.

A RADICAL CHANGE IN SUGAR MAKING.

MESSRS. EDITORS:—Suffer me to lead your attention to the inclosed extracts from *Les Mondes*, of Paris, and the *Diario de la Marina*, of Havana, convinced that their perusal will prove interesting, not only to yourselves but also to the enlightened readers of your ably-conducted journal. Mr. Reynoso's discovery has caused a great sensation in this country.

JORGE CRAVE.

Concepcion, August 29, 1865.

The extract from *Les Mondes* we translate, as follows:—

"LAST SESSION OF THE IMPERIAL AND CENTRAL SOCIETY OF AGRICULTURE.—M. Payen, in consequence of the intimate relations of agriculture with the manufacture of sugar, believed it a duty to call, in a special manner, the attention of the Society to the happy thought of M. Alvaro Reynoso, of Havana, a very distinguished pupil of our national schools, of substituting the action of cold for that of heat in the concentration of sugar sirups—either those of the cane or those of the beet.

"At the present time machines for making ice have become very common and very economical. By the combustion of one pound of coal, twelve pounds of water are frozen; while, with the same pound, only six pounds of water, in the average, can be evaporated. The advantage, then, in favor of congelation, is nearly one-half. It has, furthermore, been applied with success to the concentration of sea water, to extract from it the salts of soda, potassa and magnesia which it contains; to the concentration of mineral waters to reduce them to the smallest volume possible without depriving them of their virtue; and even to the purification of sea water in freeing it from all its saline principles and making it potable. The waters of the sea desalted, the salts extracted from sea water, mineral waters concentrated, are far from having the commercial value of sugar, and of being able to bear the cost of a treatment equally expensive.

"The moment, then, was come to think of treating sugar juice by artificial cooling, in place of submitting it to heat which decomposes it, or augments considerably the proportion of uncrystallizable sugar. M. Payen had seen the results of the first experiments made on a small scale by M. Alvaro Reynoso; he was able to state that the sirups marking five to six degrees on the hydrometer of Beaume were converted by congelation, aided by movement, or by a turn of the hand analogous to that employed in obtaining sorbet ices known under the name of *granit*, into a sirup of twenty-five degrees, and water nearly pure from the melting of the ice after the sugar had been separated by the centrifugal machine, or the press.

"The able Havana chemist, who has made a name in the Spanish colonies by the publication of two highly esteemed works—"Progressive Studies on Divers Scientific Matters, Agricultural and Industrial," "Essay on the Culture of the Sugar Cane"—completes at this moment his practical researches on the best mode of the application of cold. At the same time he is preparing some experiments on a large scale. M. Payen undertakes to follow them closely with his illustrious associates of the Academy of Sciences—MM. Dumas, Pelouze and Peligot, and to present, in relation to them, a detailed report to the Society of Agriculture.

"M. Chevreul, in the name of the assembly over which he presides, thanks M. Alvaro Reynoso, for the communication made through the medium so honorable of M. the Perpetual Secretary, and accepts the promise which has just been made in his name."

[As there is a loss of at least 18 per cent in removing the water of cane juice by evaporation, owing to the conversion of a portion of the sugar into grape sugar by heat, if the separation could be effected without the employment of heat, the yield of sugar would be considerably increased. The freezing of water is an act of crystallization, and crystallization is a separating process. If all the water could be removed from cane juice by this process, or sufficient to induce the sugar to granulate, and if the process were a cheap one, it would indeed work a revolution in sugar making; but if the concentration is only to 25°, requiring evaporation for its completion, it is difficult to imagine that it can be economical. The novelty of the suggestion, however, and the high position of M. Payen, who introduces it, warrant us in laying it before our readers.—EDS. SCI. AM.

NOTES ON THE NEW SLOOPS OF WAR.

[For the Scientific American.]

The contracts for the construction of the machinery for these vessels were issued in the year 1863, the price agreed upon being $400,000 for each pair of engines, with boilers, etc., complete. The hulls are being constructed at the national navy yards throughout the country, none being built by private contract. These steamers are rated at "second-class sloops" in the "Navy Register," and will average 225 ft. between perpendiculars; have a breadth of beam of 41 feet, and a burden of 2,000 tuns; they will have two decks, viz., the spar and main decks—the whole of the machinery being below the latter, and, consequently, below the water line. The propelling force will consist of a pair of back-action condensing engines, having cylinders of a diameter of 60 inches, with a stroke of piston of 36 inches. They were designed by the Chief of the Bureau of Steam Engineering, and are creditable specimens of their class. Steam is supplied by four of "Martin's" upright tubular boilers, and two superheating boilers of one furnace each. Total number of furnaces, 30, each one 3 feet by 6 feet 6 inches; total grate surface, 585 square feet; total heating surface, 16,000 square feet. In reviewing the general design and the elaboration of the details of these engines, it is manifest that they are much less open to criticism than were the earlier attempts of the Bureau of Steam Engineering in designing the machinery for its war vessels. The gunboats built in 1861 and 1862, having engines of 30 by 18-inch cylinders, proved so entirely deficient in speed that new boilers, having increased grate and heating surface, in addition to a superheating apparatus, are being built by them, and for the use of these it is hoped a better rate of speed may be obtained; but there are so many defects in the engines as at present arranged that the performances can never be entirely satisfactory. The sloops of war, having engines of 42 inches cylinder and 30 inches stroke of piston, built soon after the gunboats, although an improvement on the last-named vessels, are yet defective in design and detail. In the engines for the vessels which are the subjects of these notes, the slide valves and their working gear have received some valuable modifications. The valves have been made "double ported," thereby giving a quicker opening, and reducing the size and throw of the eccentrics. Steel rollers have been introduced for carrying the weight of, and pressure on, the valves, and a large proportion of the surfaces of the valves has been balanced by "Waddell's" patent balance plate. By means of this arrangement that portion of the inside surface of the valve within the edges of the "balance plate" is open to the same pressure of steam as the back, and is, therefore, "balanced." This plan of relieving the pressure on large slide valves has, for some years, been in successful operation on the Royal Mail steamer *Persia*, of the Cunard line, as well as in the navy. It might be supposed that the use of rollers under the *face* of a slide valve would not be admissible. The inventor of this arrangement designs that the rollers should barely touch when first fitted in, but, as the face of the valve and its seat wears down, the rollers receive a considerable proportion of the unbalanced pressure on the valve, substituting a rolling for a sliding motion. Rollers under the lower edge of the valve are in daily use in the navy, and give entire satisfaction. The reversing gear for these engines is, in some of its details, light and ill-proportioned for the duty it has to perform. The counterbalance introduced will balance the weight of the links only, leaving the power to move the valve (which, in reversing, with the eccentrics in certain positions, will be moved several inches) and the friction of the various journals to be overcome by a small hand wheel on the engine platform, operating through the agency of a worm and wheel. Much difficulty must be experienced in reversing the engines promptly, as it will require for that purpose more operators at the wheel than can reasonably be expected to be in the engine room at any one time. A very good arrangement—one that has been in use in naval steamers, and is in general use on large screw steamers of the merchant marine—is the combination of a steam cylinder with the reversing shaft and arms, for the purpose of raising or lowering the links. Such an apparatus has, for some reason, been omitted in the design of these engines, although its use would certainly facilitate the maneuvering of the engines. It would be noticed by even a casual observer that the main cross-head slides of these engines have unusually large surfaces. So much trouble has been experienced on board of naval steamers, both screw and paddle wheel, from an insufficiency of surface in this very important part, that the value of this increase will be appreciated. As friction is independent of surface at ordinary speeds, the dimensions so often given to main slides could, where practicable, be increased with great advantage, and with this modification one source of delay to the vessel and annoyance to her engineers would be removed. The air and circulating pumps are entirely separate, and each is double-acting. This is manifestly an advantage, as the former plan of combining the two pumps in one, causing one end of the pump to use fresh water and the other end salt, was productive of much trouble, causing both a loss of fresh water and the introduction of salt water in the hot well. The suction valves are unnecessarily large, and the space between the piston at the end of its stroke and the valves is so great (more than the capacity of the pump) that much trouble may be apprehended from the uncertain action of the valves, caused by the vapor inclosed within this space. It is asserted that the momentum which the water acquires in descending from the condenser of the pump will insure a prompt movement in the valves; but this cannot be relied upon when at sea, and it is more advisable to bring the valves as close to the end of the pump barrel as possible. The pump barrels are lined with brass, and the weight of the pistons is borne as usual by lignum-vitæ rings, which are to be recommended for that purpose. A manifest improvement has been made in the reduction of the capacity of the surface condenser to that actually required (about one-third of the heating surface of the boilers), and in passing the refrigerating water but once through the tubes. In some of the gunboats before referred to, the condensers contained twice the number of tubes required; and the refrigerating water, by being twice passed through them, became, some time before it was discharged, so heated as to be of little avail in condensing the steam. The great pressure brought upon the pumps in forcing the refrigerating water to change in direction so often, caused their pistons to leak badly, their valves to pound and wear out very rapidly, and in some instances bursting the bonnets of either the condenser or pumps. The tubes in the condensers for the vessels which are the subject of these notes, lie in the direction of the length of the ship—the exhaust steam entering the condenser by two nozzles in front, and being distributed around and among the tubes by a channel way having a narrow opening extending the whole length of the condenser. By this arrangement the whole of the tubes are made available, which was not the case in the condensers of the gunboats, where there is a difference of many degrees in different parts of the condenser.

The working parts of these engines are very massive, and their dimensions might be reduced with advantage. The metal of the cylinders, channel plate, etc., is also much heavier than is found in ordinary practice.

The boiler power in these ships is ample, and by means of the superheating apparatus attached, a considerable economy of fuel may be expected, besides a more satisfactory action in the engines. There are no blowers supplied, in which omission the good judgment and the experience of the designer may be seen, as it is well known that the duty of a Martin boiler cannot be greatly augmented by the use of a blower, owing to the contracted calorimeter, while the consumption of coal under those circumstances is greatly increased. A steam jet has, however, been applied in each steam chimney, a moderate use of which jet is often found advisable, as it is the speediest way of bringing the fires, when small, to a full action.

The screw propeller for these vessels is of brass, and has four blades, each 27 inches wide, with a pitch at the forward edge of 26 feet, expanding at the after edge to 30 feet. The mean pitch of 28 feet will require the engines to perform 50 revolutions per minute, in order that the vessel may have—in ordinary weather—a speed of 14 miles per hour. This

will allow of a slip of 16 per cent, which is considered ample for vessels having the lines, etc., of those under remark.

The engines, owing to their strength of detail, will be capable of working much beyond the speed mentioned with safety, should the boiler power be sufficient to allow of it. It should not be expected that a man-of-war, which is necessarily of a fuller model than a clipper-built merchant steamer, and which, in addition to its large crew, with their provisions, etc., for many months, is obliged to carry a heavy battery, with ammunition, etc., can be propelled with the same economy of fuel as its rival in the merchant marine. But it cannot be denied that the sloops-of-war, which are the subject of these notes, will, when completed, compare favorably with any vessels of their class in the world. ENGINEER.

September 25, 1865.

[These engines are not of the class usually known as "back acting." They are direct-acting horizontal engines, precisely similar to those used in factories every day.—EDS.

Correspondence

Steam in Long Pipes.

MESSRS. EDITORS:—In your paper of July 29th, in answer to a question from Mr. John C. Gardiner, in regard to length of steam pipes, you stated the case of the Gould and Curry Mine. Having been at that time the chief engineer and projector of the works in question, I will give you some facts.

The mine was worked through three tunnels—upper, middle and lower—with a respective difference in their levels of about 225 feet each. In consequence of a very heavy winter and the softening of the hanging wall of the mine, it became evident that the mine would cave or fall in; therefore it became necessary to project some other works which would secure the yield of the mine at a lower depth, outside or below the "cave." There was no shaft from the surface, so that there had to be put up temporary works in some secure part of the mine until a shaft could be put down from the surface. I then carefully considered the troubles arising from putting a boiler in the mine; and, on the other hand, the ease with which a steam pipe could be carried there from a boiler on the surface. In fact I had no other recourse, as, if I put a boiler in the mine, I would have to use part of the old workings for a smoke-stack, but as that was going to "cave," I would then have had no smoke-stack at all, so I resolved to carry the steam 1,300 feet, which was the shortest available distance to the surface. I had no data to work on other than the knowledge that, in some coal mines in the north of England, they have carried steam six or seven hundred feet for accessory work, from lower levels than the main pumping level. It was "Hobson's choice" with me; but I was fully aware that I staked my reputation in the experiment.

The boiler was of the common Mississippi style—two flues of 42 inches diameter 26 feet long, and two flues 14 inches diameter, having also steam and mud drums. The steam was taken from the steam drum and passed through a superheater under the boiler—the same firing answering for both—and thence through a 4-inch gas pipe down an air shaft to the lower tunnel, where I had fixed an expansion joint and also an accumulator; this was a small boiler, 30 inches diameter and 5 feet long—its object being to catch water in case the boiler should foam, or to drain the pipe beyond. As the pipe raised gradually from this accumulator to the engine, with the grade of the tunnel, it was in just the right place. The length of the steam pipe in the air shaft was 201 feet. From the accumulator the pipe ran alongside of the tunnel, to a branch tunnel, to the engine room—600 feet long—in the branch tunnel—500 feet long—and up a slight incline to engine room, 40 feet more—making, in all, a steam pipe of 1,341 feet in length. In the engine room was placed another accumulator, the same as the one at the bottom of the air shaft, but set on its end—the steam going in at its middle and out to the engine at the top. The object of this one was to catch whatever water might be carried with the steam, also scale from the iron pipes, and to form a kind of reservoir for steam; as the engine had a variable cut-off on, it acted as such to a considerable extent. On each of the accumulators, was placed one of Furman's steam and water traps, also a gage to note pressure.

The engine was made at the Vulcan Iron Works in San Francisco, and was a horizontal cylinder of 14 inches bore, 30 inches stroke, and was used cutting off at half stroke. It hoisted a bucket for sinking purposes, holding one tun of rock, in one shaft 200 feet deep; in another shaft a cage, with car and load weighing 3,000 pounds. The speed of hoist was 400 feet per minute; it also worked a pump of 8-inch bore, 4-feet stroke, with its machinery in the third shaft. The amount of water was not much—about half the capacity of pump, as the pump was going sucking about half the time. The trips of hoisting were made about every ten minutes, respectively—sometimes both were hoisting together. The hoisting apparatus was of the friction variety—the same as generally used in these mines; in all I think the engine had to do about 35 horse-power of work.

The steam pipe was 4-inch gas pipe screwed together with flanges at intervals of 100 feet. For convenience of repairs, in every 400 feet there was an expansion joint. The pipe was anchored to the side of the tunnel in the middle of that distance, so that it expanded both ways from that point. The casing of the pipe was of wood, made of two by 12-inch plank—making a box of eight inches square inside, in the center of which rested the pipe on saddle pieces, the balance of space being filled with common wood ashes. The expansion of the pipe was very nearly two inches per 100 feet, from 60° to temperature of the steam at 80 pounds pressure. [325°, Eds., SCI. AM.] The difference in pressure at the boiler from that at the engine, could not be detected; I changed the gages (Ashcroft's) from the boiler to the engine, but no difference could be found. I even made two gages of gas pipe, half-inch, of common siphon shape, and filled them with mercury. I made them long enough to suit our working pressure, and still no difference in pressure between boiler and engine. I also made experiments without the superheater, and found no difference in pressures. The only loss was an increase in the amount of water trapped off from the pipes. The loss would then be one cubic foot per hour trapped off; with the superheater the loss was one-third of a cubic foot per hour. The amounts trapped off were accurately kept; these figures are the average, and not the result of any one hour, although it never varied much from what is given. When the flow of steam through the pipes was rapid it was less; when slow, greater.

The fuel was common pine wood, using from three and a half to four cords per twenty-four hours—which will compare with any engine having short steam pipe and doing the same amount of work with the same kind of fuel. The engine ran in the mine over one gear, during which time I made numerous experiments with it. It is now out of the mine, as they have no use for it in there. It was a complete success, as it did more than was ever expected of it, and enabled the company to declare dividends during the "caved" condition of their mine.

In conclusion, I would state that, as far as my experiments went, I see no end to the distance to which steam can be carried—it being merely regulated, more by the amount of condensation than by difference of pressure. I would not hesitate to carry it one mile, if I could cover the pipe well—that being the great point to be looked after.

ROBT. G. CARLYLE.

Virginia, Nev. Ter., Sept. 1, 1865.

Galvanizing Cast Iron.

MESSRS. EDITORS:—At some time during the past year I have read a series of interesting articles upon galvanizing iron, in your paper, but I have not seen any method or process which will apply to common cast iron. I find no difficulty with wrought or malleable iron, but the process which succeeds with these fails with common cast iron—the zinc or tin will not adhere. I have used first a bath of dilute sulphuric acid, after cleaning a bath of muriate of zinc, then immersed in the tin or zinc. This process fails, as above stated. Knowing you to be interested in all that pertains to the arts, I take the liberty to inquire what is the common process in use, or best process for galvanizing cast iron. E. D.

South Dedham, Mass, Sept. 18, 1865.

[We have made repeated efforts to obtain this information, but without success; and we print the inquiry in hopes that some of our correspondents may be able to send the directions required.—EDS.

Wire Bolting Cloth.

MESSRS. EDITORS:—For the information of G. W. Waskey and others, I place at your disposal my experience in the use of wire cloth instead of silk for bolting. In 1860 I purchased one of D. C. Anderson's atmospheric wire bolts, and put it in operation immediately, and have been using it constantly up to the present time. Its dimensions are as follows:—Length of cylinder, 6 feet; diameter, 20 inches; one-third is covered with No. 64; one-third, No. 74, and the remaining one third with coarser iron wire. Bolting chest and frame for gearing, all occupy a space 9 feet long, 3 feet wide, and 6 feet high. I bolt 10 to 15 bushels per hour, make a No. 1 article of flour, clean the bran, middlings and shorts in good order, use no cooler or conveyer, and give every man his own grain to within one peck—something that cannot be done where it has to pass through 30 or 40 feet of reel and over the same amount of conveyer. Wire, as a material for separating flour from bran is not known or not appreciated, or I think it would supersede silk cloth altogether. I have been in the milling business for twenty years, and have found nothing to answer the purpose for bolting so well for the same amount of money as the bolt described above.

I first used Nos. 74 and 84, and found them too fine for all kinds of grain; 60 and 70 are fine enough for any cloth for ordinary business.

B. A. HAYCOCK.

Richland, Iowa, Sept. 3, 1865.

Suggestion for a Cast-iron Statue.

MESSRS. EDITORS:—Do you know of any iron foundery where they make a casting to resemble a soldier standing "In place, Rest!" that is, the butt of the gun on the ground, one foot on the alignment, and the hands folded in front? I think such a design would be very appropriate for the top of a soldier's monument. There are founderies which cast figures to resemble animals, and I should think such a design would pay for the trouble. A. R. B.

Cherry Valley, N. Y., Sept. 28, 1865.

Shooting a Candle Through a Board.

MESSRS. EDITORS:—It is a well-known fact that a candle can be shot through a board; now if the board could be impelled against the candle with a velocity equal to that of the candle when shot from a gun, so that the relations of the two should be the same as in the first instance, at the moment of contact, what would be the result? J. W. P.

New York, Oct. 2, 1865.

[Doubtless the candle would be smashed.—EDS.

The Definition of Work.

MESSRS. EDITORS:—Mr. Nystrom seems extremely anxious to convince some one of the correctness of his peculiar definition of the mechanical term "Work." After an unsuccessful attempt against the *savans* of the country in the *Journal of the Franklin Institute*, he now tries, through the columns of the SCIENTIFIC AMERICAN, to urge his confusing ideas upon your readers. Permit me to offer a correction to any who has taken Mr. Nystrom's dose. As the definition is one in mechanical *science*, we will ask it of men of universally acknowledged pre-eminence in the scientific world. Prof. W. J. M. Rankine, probably, now stands first in his specialty—mechanical science. In his work on "Prime Movers" I find that "the action of a machine is measured, or expressed, as a definite quantity, by multiplying the motion which it produces into the resistance—or force directly opposed to that motion—which it overcomes; the product resulting from this multiplication being called 'work.'"

The high scientific attainments of Dr. J. R. Mayer have won for him the respect and admiration of the first scientific men of our age, and his wonderful success in ascertaining the mechanical equivalent of heat by mathematical investigation has won for him a place in history by the side of Newton and La

Place. We certainly cannot ask instruction of more reliable authority.

In his "Celestial Mechanics," in the chapter on the "Sources of Heat," he says:—"The mathematical expression for *work* done—that is to say, a measure of this work—is obtained by multiplying the hight expressed in feet or other units by the number of pounds lifted to this hight."

No *time* is mentioned, nor is it ever in speaking of the measure of work. Work cannot be done without occupying time, but the *measure* of work is as independent of time as is the equally indispensable length of shaft through which that work may have been done. When time is introduced, the expression becomes one of *power*.

The performance of Cornish, or pumping engines generally, is measured in units of work performed by a unit of coal. The unit of work is the foot-pound—that of coal, the bushel of 112 pounds. We say that the Cornish engine of East London has performed work amounting to more than a hundred millions of foot-pounds with a bushel of coals, saying nothing of the time occupied in doing that work, or the power exerted by the engine. Work is, therefore, measured independently of time, say the best authorities and common usage. R. K. T.

Providence, R. I., Sept. 10, 1865.

[The relation of ideas to sounds is arbitrary. The sense in which any word is to be employed is that in which it is generally used by the community speaking the language; and this is to be determined by the recognized authorities. The authorities for the meaning of technical terms are the masters of the science or art to which the terms belong. With this citation of Rankine and Mayer, in addition to Morin, we rest the discussion. It is a small and simple matter, and we have given up to it quite enough of our space.—EDS.

Dipping a Razor in Hot Water.

MESSRS. EDITORS:—Having seen in your valuable paper the question asked, "Why does a razor cut better for being dipped in hot water?" I venture upon what seems to me to be a reasonable explanation.

That wonderful little instrument, the microscope, reveals to us the fact that the edges of all tools, instead of being perfectly smooth, are really toothed like a saw. Now, when the razor is dipped in hot water, it causes these little teeth to expand, thereby rendering the distance between them smaller, and, consequently, giving the razor a smoother edge.

At first thought it might seem that the teeth would expand the same distance in every direction, thereby leaving the edge in exactly the same condition as it was before its "hot-water bath." But when we consider that the base of the tooth is thicker than the edge, the explanation is clear; for the former will expand in a greater degree than the latter, thus making the distance between the teeth small; or, in short, making a finer saw. We all know that the finer the work to be done, the finer must be the saw employed; hence, when we wish to saw off our whiskers (how few are conscious of doing such an act), we resort to the last means of sharpening the instrument—dipping it in hot water.

Is not this exp'anation the most reasonable that can be given? P. DUBOIS.

Philadelphia, Sept. 23, 1865.

[On placing a well-strapped razor under one of Smith & Beck's microscopes, with a lens of fourtenths focus, we find the edge—not indeed formed of fine teeth—but irregularly notched, and perhaps sufficiently so for our correspondent's explanation. In this case, as in all others, the first step should be to ascertain, by honest, careful and repeated comparison, whether there is any foundation in fact for the prevalent opinion. Does a razor cut any better for being dipped in hot water?—EDS.

Eyesight.

MESSRS. EDITORS:—In your issue of 30th ult., a correspondent, "C.," advises people to rub their eyes in the manner stated, to prevent flattening of the eyeball. He says "the pupil becomes flattened," by which he betrays a want of correct knowledge on the subject. Like recommendations from unscientific men have been published frequently for many years past, and based upon an alleged habit of John Quincy Adams—that of rubbing his eyes from without, inwardly, while washing. If the eyeball flattens with age, it occurs from a lessening of its contained fluids, or from other structural changes, which pressing of the ball with the finger has no tendency whatever to relieve. Eyes may be permanently injured by the practice, as all the delicate portions of the organ are strained and violently distorted each time. To preserve the sight, carefully avoid straining the eyes, use bright, steady lights, with good green shades over them, and, when necessary, use glasses of low-magnifying power. R. F. S.

The Vortex Question.

MESSRS. EDITORS:—Can you tell me the cause of the little whirlpool often noticed above an orifice from which water is escaping? Also, whether the commonly received idea, that the direction in which it turns is dependent on the rotation of the earth, is correct? I have made several observations on them, and find that, although they may be *made* to turn in either direction, if undisturbed they usually turn in the opposite direction from the hands of a watch, thus agreeing with theory. Still, I cannot understand how the rotary motion is kept up, even if it is once imparted to the water. E. C. P.

Boston, Oct., 1865.

A Novel Joint Stock Company.

An English journal contains the announcement of a new "dodge" in the organization of a joint stock company. It appears that a number of gentlemen who are interested in the elevation of the working classes have commenced a company, called "The Clayton Forge Company," for the manufacture of boiler plates and bar iron, on the principle of dividing profits with the workmen and the customers. The scheme, shortly described, is as follows:—All profits up to 10 per cent will belong to the shareholders; all above 10 per cent, after providing for repairs and renewals of plant, is to be divided into three equal portions, the first of which will belong to the shareholders, the second to the workmen, and the third to the customers. The subdivisions among the workmen are to be in accordance with the wages earned by each, and the subdivisions among the customers according to their purchases. Thus the scheme says to the shareholders, "We hope to pay you something more than 10 per cent for your investments;" to the workmen it says, "You shall no longer have reason to complain that your employers get an undue share of the profits, for if they earn more than 10 per cent, you shall share it;" and to the customers it says, "Our best exertions shall be at your service, and you shall not pay too much for your iron, for if we earn more than 10 per cent, you shall have a share of the excess as extra discount." Messrs. Briggs, the colliery proprietors of Normanton, have already tried the division of profits among the workmen with good effect, and there is every reason to believe that the principle will spread not only in that but in other employments. The division among the customers is a new idea, and is of course intended to secure orders in all states of trade, and we hope and believe will be found to answer the purposes of the promoters.

It will be observed that 10 per cent clear first goes to the concern. Then, and not till then, a fund is struck off for renewals and repairs—which would amount, at least, to 5 per cent, which ought to be charged before profits are estimated. Then a third of the subsequent profits each—first, to shareholders; second, to workmen; third, to customers; but to what do these divisions of profit really amount? extra wages and extra discount—that is, a higher rate of wages and lower rate of prices to insure workmen and customers. If not these, the scheme is fallacious—but if these, why not carry on the business plainly and directly upon that system without the mystification of shares to retain workmen or customers?

The Great Mont Cenis Tunnel.

I am in a position to send you some recent special information with respect to this important work. On the Italian side, the average daily advance was 6 feet 6 inches in the first half of 1863; and in the second half of that year 4 feet 7 inches. In the first quarter of 1864, the average daily advance was 4 feet 6⅜ inches; in the second quarter, 5 feet 2 inches; in the third quarter, 6 feet 4 inches; in the fourth quarter, 6 feet 7 inches; in the first quarter of 1865, 7 feet, and in the second quarter, 6 feet, 10½ inches. In 1863 the average daily advance at the French side was 3 feet 10½ inches; in the first quarter of 1864, 4 feet 0½ inch; in the second quarter, 3 feet 9 inches; in the third quarter, 4 feet 5 inches; in the fourth quarter, 4 feet 9 inches; in the first quarter of 1865, 5 feet 6 inches; and in the second quarter, 7 feet 1 inch. At the close of June a total distance of 16,012 feet had been pierced, and by January, 1870, the whole tunnel is expected—if no unforeseen difficulties arise—to be carried out.—*Correspondent of the London Engineer.*

A Poisonous Tomato Worm.

The Port Byron (N. Y.) *Times* says that several persons near Auburn have recently been fatally stung by a large worm that infested tomato vines, death ensuing within a few hours. A lady in Port Byron discovered one of these monsters on her tomato vines one day last week, and narrowly escaped being stung. The worm is described as about three inches long, of a green color, and armed with claws and nippers, with a black horn protruding in front some three-fourths of an inch long. A writer in the Rochester *Express* states that a few days since he took one of these worms from his tomato vines, and confined it about a week in a glass jar, awaiting its change into the chrysalis state. Upon being released it burrowed its way into the ground nearly a foot, or as far as the thread by which it was held would permit. Under the impression that it might resurrect itself another season in the milder form, and become the parent of a numerous and destructive progeny, it was killed.

Early Radishes.

A writer in Galignani's *Messenger* states that radishes may be grown in a very few days by the following method:—

Let some good radish seed soak in water for twenty-four hours, then put them in a bag and expose it to the sun. In the course of the day germination will commence. The seed must then be sown in a well manured hot bed, and watered from time to time with lukewarm water. By this treatment they will, in a very short time, acquire a sufficient bulk and be good to eat. If it be required to get good radishes in winter during the severe cold, an old cask should be sawed in two, and one half of it filled with good earth. The radish seed begining to shoot as before, must be sown in it, and the other half of the barrel put on the top of the full one, and then placed in the cellar. For watering, lukewarm water should be used as before. In the course of a few days the radishes will be fit to eat.

SPECIAL NOTICES.

William Alford and John D. Spear, Philadelphia, Pa., have petitioned for the extension of a patent granted to them on the 18th day of May, 1852, for an improvement in iron safes.

Parties wishing to oppose the above extension must appear and show cause on the 30th day of April next, at 12 o'clock, M., when the petition will be heard.

Rebecca C. Wheeler, administratrix of the estate of Thomas B. Wheeler, deceased, of Albany, N. Y., has petitioned for the extension of a patent granted to him on the 16th day of December, 1851, for an improvement in grain sieves.

Parties wishing to oppose the above extension must appear and show cause on the 27th day of November next, at 12 o'clock, M., when the petition will be heard.

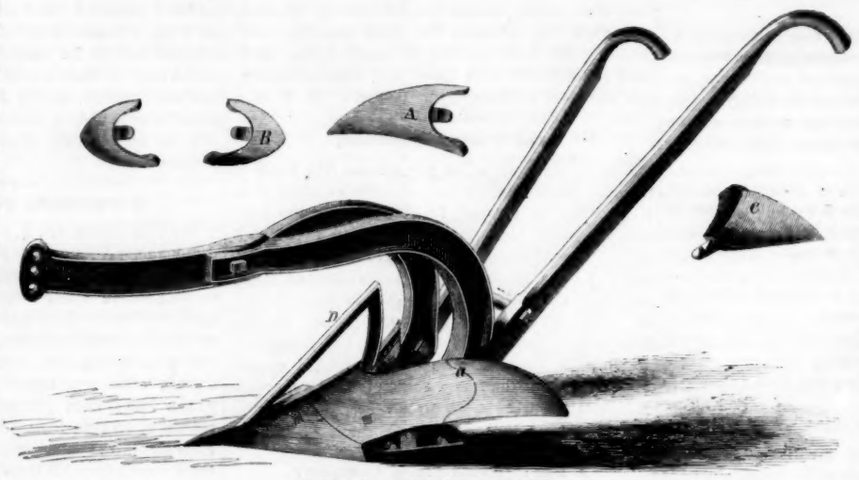
A SMALL lead shot weighing ·072 gramme was found to cause 192 times its own volume of air to penetrate beneath the surface of water by being thrown into it from a hight of 1½ feet at an angle of 60 degrees.

THE refuse of horn used in the manufacture of combs is used in the manufacture of prussiate of potash, and from the waste in this process is obtained the de ate pineapple flavor used by confectioners.

A SOLAR eclipse will take place on Thursday, the 19th inst. Prepare your smoked glass.

Improved Hilling Plow.

Those persons who have, early or late in life, been obliged to bend their backs over a hoe, know what fatiguing work it is, and how it tires every muscle in the body. Those who are *not* obliged to do it themselves, but have to pay others for it, know what an expensive and unsatisfactory piece of business is sometimes made of it. The ends of the rows, where the eye of the farmer naturally falls, are fair to view, but in the middle the slothful laborer has made a beggarly account of his time. The plow here illustrated is designed to expedite the labor and make it more thorough. The patentees say of it:—



BETTS'S HILLING PLOW.

"Being practical farmers ourselves, we think all will agree with us in saying that improvement in double mold-board plows has been very much needed. In this plow, which we have spared neither time, labor nor expense to perfect, and which is adapted to every kind of soil in which cast-iron plows are used, we have succeeded beyond our most ardent expectations. It will run as deep as may be desired without any extra exertion in holding; it holds easy and runs steady, and is not liable to clog; it will work different widths of rows by using it either with or without the long or short wings, A and B, thus making a large or small hill, as may be desired. It will allow a portion of the loose soil, and also lumps and stone, instead of being thrown upon the plants, to fall in the center of the furrow, leaving the ground perfectly loose and mellow between the rows, which is very necessary to allow the fibrous roots of plants, and especially of corn, to penetrate from one row to the other; and, also, very important in a drouth, as it allows the moisture to be absorbed more readily during the night. By using the plow with the center piece in it will prevent any soil from falling in the center of the furrow, and leaves the bottom clean and smooth, very suitable for ridging, surface draining, or for nursery purposes.

"In sections of country where quack grass is to be overcome, the guard colter, D, is used. The center piece, the wings and guard colter are held firmly in their places by means of wooden wedges behind. The wings are taken off, as required, and the others substituted, the lines, *a*, showing the place where they fit.

"By using this plow in the cultivation of the potato, hand-hoeing can be entirely dispensed with; this is no experiment, but an established method, which has been very successfully pursued by farmers, who prefer this way of working their potatoes to any other, believing that a better crop can thus be realized, and with less labor than by other management.

"After the ground is plowed and thoroughly harrowed, let the furrows be made deep and at equal distances apart; when the potatoes first make their appearance, or when they are one or two inches high, use this plow, arranged wide enough, and, if necessary, with the center piece or guard colter in, to bury the potatoes entirely under by passing once between the rows; then, with the harrow, drag over the same way (no danger of injuring the potatoes), which will leave the ground freshly plowed and harrowed. Very soon the potatoes will again make their appearance, free from grass, and with as much ground on the hill as is necessary, after which they may be cross-plowed with this plow as often as desirable.

"For a great variety of work, and thoroughness in it, we assert this plow stands pre-eminent. It has been awarded the highest premium at every county fair at which it has been exhibited, and elicited the highest encomiums from the farmers present."

It was patented by Messrs. A. C. & R. L. Betts, of Troy, N. Y., May 17, 1864, to whom all communications in regard to town, county or state rights should be addressed.

KENDALL'S PISTON PACKING.

The engraving represents a plan for packing pistons to render them steam or water-tight. Instead of the usual metallic rings, the inventor provides a brass spring coiled in continuous circles and inserts it between the heads or flanges of the piston, as clearly shown in the engraving. It is claimed that this method of packing a steam piston is cheaper,

Fig. 1

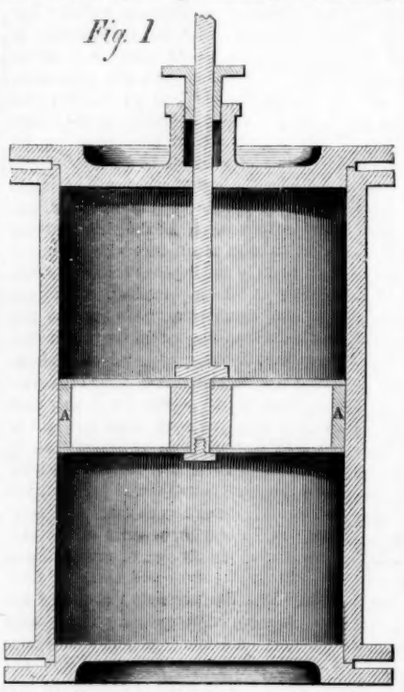
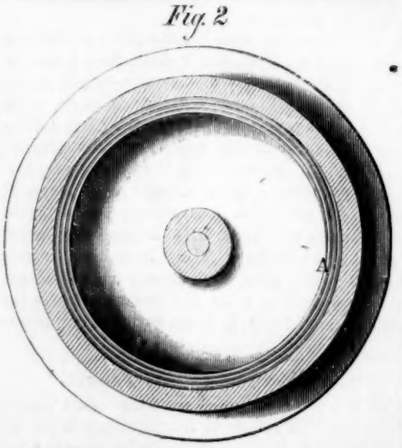


Fig. 2



more expeditious and less liable to get out of order than that generally used, and that it requires no attention after it is put in until it is worn out.

The invention was patented through the Scientific American Patent Agency on July 11, 1865, by Edwin Kendall, of New Lebanon, N. Y. For further information address him at that place. It is on exhibition at the Fair of the American Institute.

Rifle Trial.

A very interesting trial of rifled arms for one of our colonial governments took place at the Rifle Range, Woolwich Arsenal, on the 7th September, in the presence of Major Pasley, R. E., the Military Commissioner for the colony, and other officers. The rifles, which were selected by chance out of 1,000 arms, were in pattern precisely similar to that known as the "oval-bore sapper rifle," except that the mountings are of iron instead of brass, and the caliber of the minor axis is ·565 to suit the ·550 ammunition; ratio of spiral, one turn in 36 in. The range chosen was 1,000 yards. Each rifle was fitted into the machine rest and fired without altering the elevation or direction of the rest. Diagrams of twenty shots with each rifle were taken. These diagrams, which we have inspected, are really so extraordinary that we have great pleasure in giving to them the publicity they deserve. The rifles were "Lancasters," oval-bore, the bore being ·565, quantity of powder 2½ drams, R F.G. The bullets were ·55 boxwood plug, and the lubrication wax. The cartridges were rolled one cut outside, and the rifles were fired from a fixed rest. The hits made were 20, the misses 0, with each rifle; total, 100 rounds, the range being 1,000 yards. The deviations were as follows:—No. 1 rifle, mean absolute deviation 30·35 inches; No. 2 rifle, 28·35 inches; No. 3 rifle, 33·15 inches; No. 4 rifle, 26 inches, and No. 5 rifle gave a mean absolute deviation of 30·5 inches.—*London Mechanics' Magazine.*

NEW BOOKS AND PUBLICATIONS.

THE CADET ENGINEER.—This is an unpretending volume of 165 pages, treating of simple matters in engineering likely to be useful to neophytes or young engineers. It is illustrated with drawings of different details of marine engines and one or two examples of boilers. If we were to criticise any portion of this work it would be that which speaks of boilers. Generally speaking young engineers know (or think they do, which is perhaps the same thing) all about engines, while the boilers are something to put coal in. Of the benefit to be derived from the proper proportions; of the faults to be avoided in design; of the amount of fire surface per inch of cylinder and foot of stroke, much may be said, and we should have been glad to have seen some discussion of these things. It is well to make the calculations examples in simple arithmetic, for it renders the book more useful to those who have never pursued the higher branches of mathematics. Published by J. B. Lippincott, Philadelphia, Pa.

RAYS OF SUNLIGHT FROM SOUTH AMERICA.—This is a volume of 70 large photographs, representing places of resort, sites, public buildings, monuments, tombs, etc., in the city of Lima, with a number of panoramic views of the guano fields in the Chincha Islands. The book forms a magnificent collection of South American views never before published. Philip & Solomons, publishers, Washington, D. C. Baragwanath & Van Wisker, agents, No. 200 Broadway (up stairs), New York.

ELECTRICITY is distributed on the surface only of bodies; the conducting power of a wire or ribbon, however, is not in proportion to its surface but to its size—to the area of its cross section.

DON'T stand near a rope under heavy strain; a man was recently killed in Connecticut by the breaking of a steamboat's hawser—the loose end flying over and striking him with great violence.

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TRIFLES.

There is an entertaining work, with which we have all been familiar in our younger days, wherein a certain tutor expatiates to his pupils on the value of eyes. "Eyes and No Eyes," the story is called, and it is in the volume "Sandford and Merton." The substance of the matter is that one youth (No Eyes) goes gaping about the world, and sees nothing but that which he stumbles over, while the other (Eyes), finds something novel, something pleasing and useful, on every hand.

The world of mechanics, of science, of art, is full of trifles, or matters that seem to be, yet few take note of them. Wise above many is he who does.

We read, in a recent exchange, that "Towers's patent pin is being manufactured in large quantities, and is highly popular." "What is a patent pin?" asks No Eyes; "a pin is a pin, if it has a point, but what is there patentable about that? By the law, a thing that has been in common use for years cannot be protected!" That is true; but, as it happens, Mr. Towers did not patent the pin.

What then? Two little nicks in it, near the point. "And what's the use of two little nicks near the point, I should like to know?" pursues No Eyes.

Simply to prevent it from being drawn out by accident, so that it holds better, does its work more efficiently—in a word, is improved a hundred fold; and Mr. Towers will very likely reap a handsome reward for his idea. Thus "No Eyes" is silenced, and walks away with his hand on his beard and new ideas in his head. He begins to think that, if there is commercial value in two nicks near a pin's point, there must be other wrinkles worth discovering, and he is the man to find them.

Most frequently we are called upon to notice the organization of new companies to work patents on what are sometimes called trifles. They are trifles, but they exercise a most important influence on the world's comfort and economy; otherwise capitalists would not touch them.

It was a small thing to put a copper tip on a shoe; a small thing to put a crease in a bobbin to hold the first end of the yarn; a little matter to make an indentation in the rim of a tobacco box, to serve as a catch; yet each and all of these trifles, we are told, return their lucky owners handsome revenues. In making cut nails, a great difficulty has been to feed the sheet to the shears properly, so as to cut the metal without waste, and many complicated devices have been invented for the purpose. Recently, some wide-awake person discovered that, by cutting the nails with a punch, and skipping one at every stroke, the sheet might be fed straight through, saving an immense amount of labor; this has been lately patented.

All these inventions are simply the practical illustration of the moral conveyed in the story mentioned at the head of this article. It is "Eyes and No Eyes" over again. Men without means go through the world crying out against their fellows for being rich when they are poor, and declaring that wealth is unequally divided, when some comrade equally poor in point of worldly goods, but with intelligence, energy, perseverance and determination to succeed, puts forth his hand and seizes a prize.

In this country there are abundant sources of wealth for those who wish it, but without eyes how can we see—without the will to succeed how can we hope to?

Some men, having burned their fingers with a patent, shake their heads sagaciously; they wag their beards, saying, "Catch me in that business again!" This is as if a shipwrecked sailor should forswear the main because of misfortune. Perpetual-motion people, water wheels that pump their own water, windmills that manufacture their own wind—because these are worthless so are all and sundry machines akin to them; but good inventions, which serve some purpose, even if it be only to cut a slice of bread straight, are saleable and valuable. "He who runs may read," says the proverb; but he who keeps his eyes open will see many things.

THE "WINOOSKI" AND "ALGONQUIN" TRIAL.

In our last issue we published the report of the "civilian experts" who conducted the unfinished trial between the engines of the *Winooski* and those of the *Algonquin*, and we now propose to inquire, very briefly, what may be learned from that experiment. An impression has been created in the minds of the community that the trial was to determine the comparative economy of working steam expansively and following full stroke; but the trial was not made for this purpose, nor did it incidentally throw any light whatever upon the problem.

Mr. Forbes made a proposal to the Navy Department to supply one of the Government gunboats with engines of peculiar construction, designed by Mr. E. N. Dickerson, and he offered, if this engine developed less power than those in the other gunboats, or developed its power at less economy of coal, to remove it and supply its place with an ordinary Government engine. Mr. Forbes's engine was placed in the gunboat *Algonquin*, and when it was completed the Department assigned the gunboat *Winooski* for comparison, and the questions which the experts who conducted the trial had to determine were, the power developed by the two engines and the cost of this power in coal. The measure of the power it was agreed should be the number of revolutions of the wheels, they being precisely alike and immersed to the same extent.

The problems seem simple enough, but they were not settled by the trial, and would not have been settled if the trial had been completed. All that would have been settled, was the power of the two engines and its cost under the exact conditions in which the engines were run during this trial. The *Algonquin's* engine, with a grate surface in the boiler of only 142 square feet, and cutting off at about one-ninth of the stroke, developed almost as much power as the *Winooski's* engine with 200 feet of grate surface and following four-tenth's of the stroke; and this result was due simply to the fact that the *Algonquin's* engine was using steam at 70 pounds pressure, while the steam in the *Winooski's* boiler was at a pressure of only 17 pounds. But suppose that these conditions had been reversed; or suppose that the steam in the *Winooski's* boilers had been raised to 50 pounds pressure, or to 30 pounds, or even to 20 pounds, what would have been the result? No man can tell by any process whatever, except that of trying the experiment. Again, suppose that the steam in the *Algonquin's* engine, instead of being cut off at one-ninth of the stroke, had been cut off at two-ninths, or three-ninths, or four-ninths, what effect would have been produced on the amount of power and its relative cost? A dozen trials might be made with these two engines, and the results reversed at each trial by some change in the conditions of one or both of the engines.

If the attempt is made to draw from this trial any lessons in regard to the comparative economy of high and low measures of expansion, the absence of equality in the conditions is still more fatal. In an experiment for such a purpose a difference of a single pound to the inch in the pressure of the steam would wholly destroy the value of the results; but in this trial the mean pressure in one boiler was 16·8 pounds and in the other 70·79 pounds.

If the two parties to the contract are willing to accept the conditions under which the engines were run as sufficient to settle the questions, then the trial has accomplished the purpose for which it was undertaken, but it is idle to study the results of running two engines under such very different circumstances for any light on the science or art of steam engineering.

THE UNITED STATES AND THE FRENCH "EXPOSITION UNIVERSAL" OF 1867.

The principal motive which induces manufacturers to incur the large expense of transporting their articles to popular fairs and exhibitions, is, that the qualities of their wares may be more widely known, and thus a larger sale may be obtained. The fairs are great advertising agencies, and to this fact they owe their success. The trade between this country and Europe consists mainly in the export of cotton, tobacco, grain, petroleum, provisions, and other raw materials, and the import of innumerable manufactured articles in return. Our manufactures are almost exclusively for the domestic market, or for export to South America and the Indies. Consequently, European manufacturers, who are eagerly competing for our market, have an interest in presenting their wares at our exhibitions, while most of our manufacturers have no interest in sending their products for exhibition at European fairs. In consequence of this controlling element, the United States have made a sorry appearance at the international exhibitions of London and Paris. The English or French manufacturer of cassimere, or calico, or porcelain, may obtain an advantage over his competitors by sending samples of his goods to the exhibitions, but no individual grower of wheat, or cotton, or tobacco, is likely to have the demand for his products increased by displaying samples at these fairs. Our manufacturers of clocks, of porcelain teeth, and of a few other articles, find a demand for their wares in France, and they will probably send specimens of their work to the exhibition, but the great mass of our manufacturers and producers have no inducement to incur this expense.

We are indebted to the Hon. William H. Seward, Secretary of State of the United States, for a pamphlet containing a map of the "Exposition Universal for 1867," with the official correspondence in relation to it. From this it appears that the exhibition is to open on the 1st of April, 1867, and to close on the 31st of October, of the same year; all applications for admission, with a description of the articles to be exhibited, must be presented before the 31st of October, 1865; the expense of packing and transporting the articles must be borne by the exhibitors; if on the receipt of any article the exhibitor, or his agent, is not on hand to take charge of it, the carrier will be required to take it away immediately; goods will be admitted into the exhibition from January 15, 1867, to March 10, 1867, inclusive; the removal of all goods, after the close of the exhibition, must be completed before the 30th of November, 1867; all communications by exhibitors from this country should be addressed to N. M. Beckwith, Esq., care United States Legation, Paris, France. The space allotted to United States exhibitors is 2,788 square meters—about equal to an area of 100 by 300 feet.

Unless the time for making application for admission is extended beyond the close of the present month, certainly no considerable number of articles can be expected from this country. The exhibition has been mentioned to a very limited extent in our papers, and probably not one in ten thousand of our people has yet heard that such a fair is to be held in the summer of 1867. It would require extensive advertising, and probably an appropriation of money by Congress for paying the freight on articles, to fill even a quarter of the space which has been assigned to this country, but if all exhibitors must make their

applications before the close of the present month, the managers may reduce the space allotted to us from 2,788 square meters to 88, as that will be amply sufficient.

Since writing the above we have received a letter from the Secretary of State, in which he informs us that Mr. Bigelow, our Minister at Paris, has been instructed to ask for an extension of time of filing the applications of exhibitors residing in the United States. If this application is successful some competent person will, doubtless, be selected to take charge of the business in this city.

ISSUED FROM THE UNITED STATES PATENT-OFFICE
FOR THE WEEK ENDING OCTOBER 3, 1865.
Reported Officially for the Scientific American.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

50,214.—Bit Stock.—Charles H. Amidon, Greenfield, Mass.:

I claim the combination of the movable screw socket, A, jaws, B B, and sleeve, C, with a bit stock, when constructed and operating substantially as described.

50,215.—Loom.—R. W. Andrews, Staffordville, Conn.:

I claim the arrangement of one or more elastic friction plates, or their equivalents, with the shuttle boxes of looms, in such a manner with relation to the picker staffs or picker blocks of said looms as to produce the within-described desirable results, and in substantially the manner herein set forth.

50,216.—Stove Damper.—George Asmus, Portage, Mich.:

As a new article of manufacture, I claim the hinged damper and slip weight, adjustable on the bar, C, in combination with the inclined face of the draught channel, A, of a heat generator, constructed and operating substantially as and for the purpose set forth.

Also, the curve, a, in the bar, C, in combination with the weight, D, hinged damper, B, and draught channel, A, constructed and operating substantially as and for the purpose described.

[This invention consists in the arrangement of a hinged damper and slip weight, in combination with the inclined face of the draught pole of a heat generator, in such a manner that the draught of the air rushing into the fire-place of the heat generator has a tendency to close said hinged chamber, whereas the gravity of the damper, combined with the slip weight, has a tendency to keep the same open, and that by adjusting the position of said slip weight the quantity of air admitted to the fire-place can be regulated at pleasure.]

50,217.—Cultivator.—Andrew Bouton, Napa, Cal.:

I claim the right and left cultivators, A A, supported by the caster wheel, F, and adjustable wheels, B, and connected by transverse bars, G, all arranged substantially as and for the purpose hereinfset forth.

[This invention relates to a new and improved cultivator, designed more especially for cultivating the earth in orchards in California, where the trees branch out quite close to the ground, and preclude the plow being used near the trunks of the trees.]

50,218.—Valve Gear for Steam Engines.—Adam S. Cameron, New York City:

I claim the valve chamber, H H', and valves, I I', in the heads of the main cylinder, A, in combination with the supplementary cylinders, E E, pistons, F F, and slide valve, C, constructed and operating substantially as and for the purpose described.

50,219.—Globe Valve.—William Chesley, Cincinnati, Ohio:

I claim a globe valve, the part of whose stem below the stuffing chamber is smooth, to fit the correspondingly smooth interior of the tube, and the portion of whose stem above the stuffing chamber is partly screw threaded and partly smooth, so as to co-operate with the interiorly screw-threaded cap of the stuffing box, in the manner explained.

50,220.—Mode of Revivifying Loam Luting.—John Chilcott, Brooklyn, N. Y. Antedated Sept. 22, 1865:

I claim the revivification of spent loam luting by the addition of fresh loam, substantially as herein specified.

50,221.—Setting Steam Boilers.—John Chilcott, Brooklyn, N. Y. Antedated Sept. 18, 1865:

First, I claim the arrangement of water and steam tubes, A A1 A2 A3, partitions, E F F1 F2 F3, and flues, D D1 G G1 G2, substantially as herein specified, whereby a horizontal and vertical circulation of the gases of combustion between the tubes is provided for.

Second, Providing in the top, sides and back of the outside setting of a boiler a continuous system of flues, I I and J J, whereby the gaseous products of combustion are caused to circulate many times back and forth through the setting, substantially as herein specified.

50,222.—Process for Tanning.—Orson A. Coe, Charleston, Ohio:

First, I claim the first solution herein described, and composed of the ingredients described under No. 1, and employed for tanning skins with the wool, hair or fur on.

Second, The combination of the first and second solutions, made and used substantially as and for the purpose specified.

Third, The combination of the first, second and third solutions, all made and used substantially as and for the purpose described.

[This invention relates to a process which is equally applicable to tanning light skins with wool, hair or fur on, or to tanning hides or skins for leather.]

50,223.—Saw Mill.—A. P. Conant, Smithland, Ky.:

I claim the vertical adjustable revolving head, E, provided with guide rods, f, and screw spindle, g, in combination with dogs, F, and with the head block A, of a sawing machine, constructed and operating substantially as and for the purpose set forth.

[This invention consists in the arrangement of two dogs, which are adjustable according to the width or thickness of the log to be clamped between them, and which are guided by rods secured in the end of a swinging head, which can be raised or lowered on a standard rising from the head block, and which also allows of being turned in a horizontal plane in such a manner that by raising and lowering the head the position of the dogs can be readily adjusted to suit the diameters of different saws, or the size and shape of different logs or pieces to be sawed, and by turning said head the dogs can be swung back out of the way, or forward in their working position, and the operation of adjusting the log in the proper position for sawing is greatly facilitated.]

50,224.—Revolving Fire-arm.—Silas Crispin, New York City:

I claim the application to a revolver, having its barrel swinging from the frame by a hinge joint, of a transversely divided cylinder, when one section thereof is connected to the swinging barrel, and the other section to the stock or frame, each being retained by its own section of the center pin, in the manner shown and described.

50,225.—Sewine Machine for Making Ruffled Fabrics.—C. O. Crosby, New Haven, Conn.:

First, I claim the combination of the check and carrier for the second thread, substantially as and for the purpose specified.

Second, The combination of the check and carrier for the second thread with a sewing mechanism, substantially as and for the purpose set forth.

Third, The combination of the carrier for the second thread, feeding mechanism and clamp, substantially as and for the purpose described

50,226.—Construction of Sheet-metal Boxes.—Daniel Croak, Milwaukee, Wis.:

I claim the constructing of sheet-metal boxes or cans with a seam, composed of lips or projections and notches at the ends of the plate forming the body of the box or can, and also with slots, in order to form a locked joint, substantially as shown and described.

[This invention relates to a new and improved mode of constructing sheet-metal boxes or cans, and it consists in a novel manner of forming the seam.]

50,227.—Picker for Looms.—Benjamin F. Day and Chas. H. Nelson, Biddeford, Me.:

We claim the box constructed as described and represented, having a means of attachment to the picker staff, an opening in its face to permit the nose of the shuttle to strike the contained disks, and an opening, c, at the top for the ready insertion and retraction of the cushion disks, as may be required.

[It is common to protect the picker against the blow which it receives from the nose of the shuttle by means of cushions of leather, rubber or hide, the different layers being secured to each other and to the picker staff by bolts or bands. One of the defects of these cushions is their liability to split and be torn apart by the violent blows it gives to and receives from the shuttle, making it necessary to stop the loom to replace it with a new picker, thereby incurring a loss both of time and money. This improvement consists in using a metallic box, of any suitable form, to receive the leather or other substance composing the cushion of the picker.]

50,228.—Apparatus for Tanning.—Charles R. Dean, Randolph, N. Y.:

I claim the construction of a hollow cylinder, or its equivalent, with slots, or their equivalent, and compartments, and the applications thereof, in the process of tanning, substantially as above described.

50,229.—Cultivator.—Isaac Dunham, Lanesfield, Kansas:

I claim the arrangement and combination of the several parts, substantially as described, in their relation to the frame and running gear, whereby the machine is adapted to the different kinds of work, as explained.

50,230.—Spinning Jack.—Ezra Dews, South Britain, Conn.:

I claim the longitudinally sliding rod, A, connected to the cam lever, B d, in combination with the belt shipper, k, and catch, l, operated by the faller or copping wire of a spinning jack, substantially as and for the purpose set forth.

50,231.—Cook Stove.—Albert S. Dunham, Taunton, Mass.:

First, I claim the construction of the air chambers, and placing them at each side and at the top of the fire box, to draw in the pure air to be heated and conveyed into the oven or through between the plates of the oven doors, as herein described, for the purposes set forth.

Second, I claim the arrangement of the air chambers, flues and dampers, whereby the atmospheric air can be heated and circulated without becoming impregnated with the gases from the fuel, to facilitate baking in cook stoves, as herein described.

50,232.—Many-barreled Fire-arm.—William H. Elliot, Ilion, N. Y.:

First, In a many-barreled arm, in which a separate firing point or pin is employed for each chamber, I claim so constructing and operating said pins in relation to the hammer that only one of them will be driving forward at a time, as herein shown.

Second, The combination of the cam and firing pins, for the purpose of throwing one or the other of said pins before the hammer, as herein set forth.

Third, The angular pin, n, in combination with the reflecting surfaces, n, for the purpose herein set forth.

50,233.—Lubricator.—J. H. Ferguson, Springfield, Mass.:

First, I claim the lateral passage, a, and its triangular groove in the valve plug, and the vertical passage, g, in the bottom of the plug, in combination with the screw thread, b, by means of which the plug is adjusted, substantially as above described.

Second, I also claim the finger, G, arranged with and projecting downward below the plug, D, constructed and operating substantially as above described.

[One of the objects of this invention is to apply oil to bearing surfaces continuously, and not intermittently at long intervals, according to the usual mode—experiments by Morin having demonstrated that the friction is about 28 per cent less when such surfaces are lubricated by a continuous flow than when they are lubricated from time to time, and that less oil is used, because there is less opportunity for wastefulness. Another object is to be able to adjust the lubricator and supply it while the machinery it is attached to is in motion.]

50,234.—Washing Machine.—Benj. S. Fletcher, Cornish Flat, N. H.:

I claim the movable slotted blocks, a a a, the screws, B B B, and the set screw, C, constructed, combined and arranged substantially as described, for the purposes specified.

50,235.—Fire Plug.—Jacob Fricker, Cincinnati, Ohio:

I claim as new and of my invention the reversible plug, B, provided with a waste way, C, in the described combination with the drip hole, D, and stops, G G, or devices substantially equivalent, for the purposes described.

50,236.—Wooden-soled Boot and Shoe.—James Fulton, Zanesville, Ohio:

First, I claim an improvement in the manufacture of boots and shoes having a double, that is to say, an inner and an outer wooden sole, by combining the wooden sole with a double flexible shank joined to the outer and inner parts of the wooden sole at one end, and at the other to the outer and inner parts of the heel, or as the manufacturer may prefer, having the inner thickness of the shank extended so far back as to make an inner heel or heel-piece, admitting the edge of the upper of the boot or shoe to be fastened between the inner and outer soles, and between the inner and outer shank and the inner and outer heel or heel-piece, substantially as herein before described.

Second, The combination of the flexible shank with the double wooden soles, substantially as herein described.

[This invention consists in the combination of a double wooden sole—that is to say, an inner and outer wooden sole—with a double flexible shank joined to the inner and outer parts of the sole at one end, and at the other end to the outer heel and the inner heel or heel-piece, or having the inner thickness of the shank extended so far back as to make an inner heel or heel-piece, and having the upper of the boot or shoe fastened between the inner and outer sole, between the inner and outer thickness of the shank, and between the outer heel and inner heel or heel-piece.]

50,237.—Composition for Removing Incrustation from Boilers.—John G. Gansz and Jacob J. Savo, St. Louis, Mo.:

We claim a chemical compound for removing incrustation on boilers, which compound is composed of the ingredients mentioned in the foregoing specification, united and mixed together in the proportions specified, or their equivalents.

50,238.—Rendering Casks Oil-proof.—Smith Gardner, New York City. Antedated Sept. 23, 1865:

I claim rendering casks impervious to spirits of turpentine, petroleum, and like substances, by impregnating them with sulphate of iron and muriate of lime, as aforesaid, and for the purposes herein set forth.

50,239.—Combined Shutter Hinge and Fastening.—Wessell S. Gerard, Newburgh, N. Y.:

I claim the catch or fastening, B, when fitted within a socket, d, and applied to a shutter hinge, substantially in the manner herein shown and described.

[This invention consists in combining a fastening with a shutter hinge in such a manner that the shutter when thrown open will be secured in an open state, and the fastening be capable of being readily adjusted so as to release the shutter and admit of its being closed.]

50,240.—Bobbin Holder for Spinning.—John Goulding, Worcester, Mass.:

I claim the device herein described for holding bobbins upon spindles, the same consisting of two or more centrally bulging springs, secured, as described and shown, into a seat or base fitting the spindle.

50,241.—Bobbin Holder for Spinning.—John Goulding, Worcester, Mass.:

I claim the combination with the spindle, A, of the bobbin holder, C, when constructed with a long tube or spring, c, which serves as the only support to the bobbin holder, as set forth.

50,242.—Pantaloons.—B. J. Greely, New York City:

I claim forming the fronts and also the backs of pantaloons with lapels, as shown, and holding them in place by means of elastic straps, substantially as shown.

[This invention in pantaloons is applicable also to drawers for men, women and children, and it consists in a novel way of uniting them at the place of the seam or opening in front, whereby buttons and hooks and eyes are dispensed with, the front part of the body being made with an inner and outer lapel, the outer one of which folds over the inner one, both being drawn out to and kept in their proper positions by means of elastic straps made fast to the band at opposite sides, the strap which holds the inside lapel being attached to the inside of the band, and the other strap to the outside.]

50,243.—Railroad Rail.—Alexander Hamill, Sr., and Robert J. B. Hamill, Baltimore, Md.:

I claim the arrangement and combination of the tenons, B, and keys, D, with the rails, as herein described, for the purpose of fastening the rails, more permanently and securely to the cross-ties, and dispensing with the use of spikes.

50,244.—Device for Extracting Stumps.—E. C. Haserick, Lake Village, N. H.:

I claim the application to a carriage or mounted truck of a hydraulic apparatus, constructed and arranged as described, with a water tank and a lifting frame, or its equivalent, for the purpose of raising heavy bodies, extracting stumps, etc., and transporting the same when cleared, substantially as set forth.

I further claim the screw jacks, D, when arranged and applied to the axles, in the manner substantially as and for the purpose herein specified.

50,245.—Script Printing Type.—H. J. Hewitt, Brooklyn, N. Y.:

I claim reducing or forming the body of script printing type so as to make the extending letters with a kern to project over the body of the type and between the extended letters of the lines next above and below, substantially as and for the purpose described.

50,246.—Corn Planter.—A. F. Hines, Washington, D. C.:

I claim the slide valve, q, rod, i, spring, x, in combination with valve, m, plates, N and O, spout or seed duct, S, groove, y, and frames, H, in valve, m.

I also claim rubber or spring, a, rod, F, in combination with lever, E, and the inner ring of wheels, C, provided with pins, d d d, to operate on the lever.

I also claim the arrangement of two or more shelves in hopper, said shelves slanting upward that the corn or other seed in hopper, at the least motion of the machine, will fall off into the bottom of the hopper, the whole constructed and operated in the manner and for the purposes herein set forth.

50,247.—Roller-crushing Machine.—Alonzo Hitchcock, New York City. Antedated Sept. 23, 1865:

I claim the construction of the rollers in reversible half lengths or sections, substantially in the manner described.

50,248.—Brakes for Cars.—Henry Holcroft and C. S. Smith, Media, Pa.

First, We claim as new, and desire to secure by Letters Patent, the liberation of the cart body from the thills or shafts, by the same arrangement and at the same time the brakes are put into action, as above described, or an equivalent arrangement of the same.

Second, We claim the pieces, B B, supported by the shaft, f, and chains, o, as and for the above-described purpose.

50,249.—Caster for Furniture.—P. B. Holmes, New York City:

I claim the combination with the roller horn of a caster of the plate, c, with its hollow shaft or bushing, f, as a center or bearing, for the horn to turn upon, substantially as herein described and for the purpose specified.

[This invention has for its object the formation and construction of a caster, to be used for furniture more especially, in such a manner that the strength of the legs will not, in the least degree, be weakened thereby, while, at the same time, they can be securely fastened with the horn of the caster, free to swing, the advantages of which are obvious.]

50,250.—Apparatus for Carbureting Air.—J. H. Irwin, Chicago, Ill.:

I claim the application of heated air to a carbureting apparatus, when arranged within an inclosing case, substantially as and for the purposes specified and shown.

50,251.—Apparatus for Carbureting Air.—J. H. Irwin, Chicago, Ill.:

I claim, First, In combination with a carbureting apparatus, arranged with respect to the burners which it supplies with gas, substantially as herein described, any mechanical device so arranged as to force a current of air into said carbureter, substantially in the manner set forth.

Second, A carbureting apparatus and a mechanical device for forcing a current of air into the same, when so constructed and combined that the carbureting apparatus will generate gas and supply the burners when the mechanical device is not in operation.

50,252.—Last.—George Marshall, Brooklyn, N. Y.:

I claim a cast-iron last, made with a sole, A, socket, B, and strengthening rib, C, substantially as herein described

50,253.—Button-hole Sewing Machine.—D. W. G. Humphrey, Chelsea, Mass.:

First, The mode of clamping and holding back the needle thread that the needle may draw the loop tight which was formed at the previous operation, in combination with the double-acting cam, which makes the duration of the giving operation different when the needle descends through the cloth than when it descends in the slit, or by the edge of the button hole, substantially as and for the purpose specified.

Second, I also claim holding the clamp down to the face of the table by a button, or the equivalent thereof, which, at the same time, acts as a guide for the motions of the clamp, substantially as described.

Third, I also claim making the curved part of the slot in the table in which the pin of the clamp works, eccentric to the button, which acts as a guide to the motions of the clamp, substantially as described, to admit of the required lateral motion to work the eyelets in button holes, as described.

Fourth, Making the pin of the clamp, by which the required motions are communicated to the clamp, so that it can slide up and down therein, in combination with the button that holds the clamp down to the table, substantially as described, so that the clamp can be removed from the table by drawing the pin up out of the groove in the feeding ring, and out of the slot in the table, as described.

Fifth, I also claim the springs for spreading the cloth, in combination with the clamp, substantially as described.

Sixth, I also claim, in combination with the feeding mechanism and the clamp, the stop lever for supporting the feed motion when the button hole is finished, as described.

50,254.—Portable Scales.—H. Maranville, Akron, Ohio:

First, I claim the standards, B' and C, pivoted or hinged to the rule, in combination with the spring hooks, b b', as and for the purpose set forth.

Second I claim the lips, c' c', plate, D, openings, c c, in combination with the scale beam, A', pendulum, E, and standard, B', as and for the purpose set forth.

Third, I claim the springs, f, platform, F, catch, j, pendulum, E, and plate, D, constructed and arranged as and for the purpose set forth

50,255.—Soda-water Apparatus.—John Matthews, Jr., New York City:

I claim, First, The soda-water cooler, consisting of one or more open-bottomed and close-topped vessels, B B, fitted and secured in a frame, C D E, within the cooling chamber, and having inlet and outlet pipes, j k, applied and arranged for the circulation of the soda water through them, substantially as herein described.

Second, The arrangement of the sirup-cooling chamber, g, soda-water cooling chambers, e, ice chambers, f, and communications, y and v, within the case or box, A, of the draft apparatus, substantially as and for the purpose herein specified.

Third, The tumbler chamber, b, arranged within the box or case, A, of the draft apparatus, below the cooling chamber, x, which contains the sirup vessels, substantially as and for the purpose herein set forth.

Fourth, The sirup vessels, F, having their outlets at the bottom, in communication with openings in the bottom of their containing chamber, substantially as herein specified, whereby their removal is facilitated.

50,256.—Milk Pan.—F. J. May, New York City:

I claim the two pans, A B, fitted one within the other, and the inner pan provided with a perforated bottom or strainer, b, all arranged substantially as and for the purpose set forth.

[This invention consists in the employment or use of two pans, placed one within the other, and the inner pan provided with a perforated bottom, to serve as a strainer. The inner pan contains the liquid, and when the latter is required for use the inner pan is lifted or raised from the outer one, the liquid passing through the strainer or perforated bottom of the inner pan, and remaining in the center one; thus, by simply raising the inner pan out from the center one the skimming is accomplished. The invention is more especially designed for milk pans, to obviate the necessity of skimming the cream from the surface of milk, which is now performed by means of a spoon, an operation consuming considerable time in large dairies, and attended with more or less waste.]

50,257.—Cultivator.—Robert McCorkle, Philadelphia, Pa.:

I claim, First, The metal pieces, F, provided with the horizontal flange, a, recessed to receive and hold the bolt, c, and having the lugs or projections, b, for the purpose of attaching the drag bars, D, to the slotted bar, A, and adjusting the same therein, as set forth.

Second, The plates, G and H, constructed and arranged to operate in combination with the drag bars, D, as and for the purposes set forth.

Third, The plate, I, in combination with the elbow levers, L, and plates, G, for the purpose of moving the plows, I I, as herein described.

Fourth, The rubber disk or its equivalent, in combination with the standard, n, and head, R, of the drag bar, when constructed and arranged to operate as and for the purpose set forth.

50,258.—Grate for Stoves.—Wm. McIlvain, Philadelphia, Pa.:

I claim, First, Adjusting the grates, D, at different altitudes in the fire chamber, by means of the bars, E, with the vertical projections, a, substantially as described and for the purpose specified.

Second, Constructing the front bars of the grates, D, with the lips, d, and the grooves, e, substantially in the manner and for the purposes set forth.

50,259.—Roller and Harrow Combined.—William R. Mears, Grafton, Ill.:

I claim, First, The combination and arrangement of the levers, m m', connecting bars, l l, and stay bars, k k, with the harrow bars, D D, and frame, A, of my improved machine, all substantially in the manner and for the purpose herein described.

Second, I also claim the arrangement and comoination with each other and with the frame, A, of the sectional rollers, C C, and harrows, D D, to constitute a combined roller and harrow, substantially as herein described.

50,260.—Combined Latch and Bolt.—Movius J. Meyer, Washington, D. C.:

I claim, First, The bolt, B, with the additional bevel, P, on the projection, e and the rotating cylinder, C, when arranged within a casing constructed and operating substantially as herein specified.

Second, In combination with the above, and with the tube, A, and spiral spring, E, I claim the inclines, b b, when constructed and operating substantially as and for the purposes herein set forth.

50,261.—Umbrella Holder.—J. A. Minor, Middletown, Conn.:

I claim the combination of the adjustable sleeve, f, and swinging frame or plate, h constructed and arranged together upon a common rod or staff, substantially as herein described and for the purposes specified.

I also claim in combination with the above, the use of a supplementary sleeve, s, for the purpose set forth.

[This invention relates to certain new and useful improvements in holders for umbrellas, especially adapted for carriages and vehicles of all kinds, either for protection from storms or from the rays of the sun, and consists in an arrangement of devices whereby the position of the umbrella can be adjusted at pleasure, to suit the requirements of each case, and, as may be necessary to obtain the most protection from a storm or the sun's rays.]

50,262.—Hammer.—Chas. Monson, New Haven, Conn.

I claim, First, The application of a spring or springs, or their equivalent, to hammers and other similarly used instruments, constructed substantially as and for the purpose herein set forth.

Second, Connecting hammers and similarly used instruments to the handle or shank thereof, substantially in the manner herein set forth, and either with or without the use of a spring, as described, or the equivalent therefor.

50,263.—Blasting Plug.—Charles Monson, New Haven, Conn.:

I claim the combination of the plug, A, and bar for bars, B, constructed and united together by a joint or its equivalent, substantially as and so as to operate in the manner and for the purpose herein set forth.

50,264.—Row Lock.—Peter W. Neefus, New York City:

I claim the construction of the base plate, B, with its slots, b b, and socket and chamber for the reception of the shank of A, and the lugs, a a, and a' a', constructed and combined substantially as and for the purpose specified.

50,265.—Blower for Steam Generators.—David M. Nichols, New York City:

I claim the combination of a chimney with a gridiron steam blower, constructed substantially as above set forth.

I also claim the gridiron steam blower composed of a series of straight perforated pipes, extending crosswise to a distributing pipe, by which the perforated pipes are supplied with steam, substantially as set forth.

50,266.—Boiler for Treating Straw.—T. A. Nixon, Philadelphia, Pa.:

I claim, First, The combination with a horizontal revolving boiler of tubes, c c, through which the products of combustion are caused to pass, and which maintain the contents of the boiler in constant agitation, for the purpose specified.

Second, The revolving boiler, A, with its tubes, c c, in combination with the fireplace, C, and its roof, f, the whole being arranged substantially as and for the purpose herein set forth.

50,267.—Granary.—B. M. Nyce, Cleveland, Ohio:

I claim so constructing and arranging granaries and other buildings for similar purposes, whereby they are adapted to the employment or utilizing of waste bittern from salt works, within air-tight walls, substantially as described.

50,268.—Cooking Stoves.—Clinton J. Paine, Painesville, Ohio.:

First, I claim the special use of the direct heating and directly continuous flue, C C C, constructed as shown in Fig. 3, so that the same is double radiating, or so that radiation of heat into the oven space or spaces is obtained from both its sides or surfaces, the same being constructed with angular or other turns, so as to form within its interior space a rectangular or other shaped chamber, constituting the oven proper, and located within the oven space of the stoves, in the manner shown and for the purposes set forth.

Second, The divided inlet and exit openings, Q Q and Q' Q', in the plate, B, in combination with the said flue, C, as described, and for the purpose set forth.

Third, The special construction and use of the fire draught device, V, as described, and for the purposes set forth.

Fourth, Adapting the heat absorbing and heat retaining principles of galvanized sheet iron for forming the outside plates of my stove, by filling skeleton cast iron frames therewith, and using them as walls interposed between the interior space thereof and the outer air, for the purpose of preventing the escape of the heated air therefrom, as herein explained.

Fifth, Constructing the stove in the manner described, and in combination with the said galvanized sheet iron surfaces, so that the spaces, I1 I2 I3, and D1 D2 D3, are made available for the retention of hot air to act in conjunction with the heat of the direct flue, C, as explained, and for the purposes stated.

Sixth, The aperture, G, in combination with the foregoing hot air spaces, for the purposes set forth.

Seventh, The gas burner, K, constructed with the depressions, as described, and in combination with the aperture, J, of the oven, channel, M, and aperture, L, and operating as and for the purpose set forth.

Eighth, The removable reflector baker, A', constructed as described, located and used in the manner and for the purpose set forth

Ninth, The use of the circular gratings, T and T', when yoked or coupled with the bar, V, as and for the purpose described.

50,269.—Horse Rakes.—Geo. Palmer, Littlestown, Pa.:

First, I claim the sharp cutting sickle edge rake teeth, the same being constructed, arranged and operated in the manner as and for the purposes herein specified.

Second, I claim the application of vulcanized india-rubber tube for the support of the driver's seat, in combination with the mode of adjusting the same, as herein described.

50,270.—Dust Pan and Brush.—Chas. H. Parker and Gridley Burnham, Waltham, Mass.:

We claim attaching to the back side, top or bottom of a dust pan a suitable receptable for holding a dust brush intended for use in connection with a dust pan, substantially as herein shown and described.

[This invention relates to a further improvement in a combined dust pan and dust brush patented to the same parties on July 4, 1865.]

50,271.—Marking Attachment for Sewing Machines.—Stephen Perrett, Yonkers, N. Y.:

I claim the above described appendage to the sewing machine, having the parts arranged and constructed, and the marking presser actuated directly from the rocker shaft, substantially as set forth.

50,272.—Machine for Bending Scythe Snaths.—Alfred S. Philbrook, Claremont, N. H.:

I claim the use of the form, D, of the exact size and shape desired for the snath, with its rings, i i, and its combination and arrangement with relation to the cross pieces, B' B', and the beam, E, substantially as described and for the purposes set forth.

50,273.—Knob Latch.—Hiram, Richmond and Alfred Cloude, West Meriden, Conn.:

We claim the pin or rollers attached to either side of the rod which connects the handles in combination with two inclines in the slotted shank of the bolt, one on either side of said connecting rod, substantially as and for the purpose set forth.

[This invention relates to a latch which opens by pulling or pushing the handle instead of turning the same, as usual, the bolt being pressed forward by a spring not provided with an inclined plane, so that rollers or pins projecting from the sides of the connecting rod of the handle, when being pressed against said inclined plane, will force the bolt back against the action of the spring.]

50,274.—Grinding Mills.—James C. Roberts, Adamstown, Md.:

First, I claim the vibrating palw frame or its equivalent, operated from the driving power of the mill, in combination with the interposed connecting and adjustable suspension rod for raising or lowering the bridge piece.

Second, I claim the weighted scale beam, or its equivalent, from which the bridge piece is suspended and whose oscillations on either side of the given point of adjustment actuate the mechanism for raising and lowering the bridge piece.

Third, The combination, and automatically operated, I claim the rods, G and I, and wheel nut, H, forming a suspension rod, adjustable as to length, for the support of the movable end of the bridge piece.

50,275.—Instrument for Finding the Centers of Circles.—E. P. Rogers, Corning, N. Y.:

I claim the construction of an instrument, substantially as described, so that two jaws, as at C C Fig. 3, with corresponding outline, turning upon a center pin, c, may be simultaneously adjusted, so as to touch convenient points in any circles, while the line of the inner edge of the tongue, a, shall be the radius of such circle.

50,277.—Still for Distilling Petroleum.—John Rogers, New York City:

I claim the within-described process of distilling petroleum or other hydro-carbon liquids, by passing the crude oil through heated pipes, or their equivalents in the interior of the still, for the purpose of freeing the same from their most volatile constituents, substantially as herein set forth.

[This invention consists in the application of a series of pipes, arranged in the interior of an ordinary still or retort, one pipe leading to the supply tank containing the crude oil, and other pipes being placed into the still near its exterior, and just below its center, in combination with suitable escape pipes, in such a manner that the crude oil on being let into the still has to pass through the heated pipes in the interior of the same, and during its passage through said pipes it is freed from its lightest or most volatile constituents. The operation of distilling can thus be continued without interruption, and much time and labor be saved.]

50,278.—Brake for Horse Power.—Wm. F. Rundell, Genoa, N. Y.:

I claim the placing of the driving shaft of horse-power in sliding bearings, acted upon by springs or their equivalents, in such a manner that the band wheel on the driving shaft will, when the band is cast off from it, be thrown in contact with a brake, and the machinery at once stopped, the tension of the band, when on the wheel, keeping the latter free from the brake, substantially as set forth.

I further claim the hinged plates and spring catches, applied to the bearings of the driving shaft, in the manner substantially as and for the purpose specified.

50,278.—Pea Sheller and Cherry Stoner.—Geiston Sanford, New York City:

I claim the two adjustable rollers, A A, in combination with the feed board, D, constructed and operating in the manner and for the purpose specified.

50,279.—Stockings.—E. V. Sears, Boston, Mass.:

I claim, as a new article of manufacture, a stocking, which is provided with means for receiving the supporter, b.

50,280.—Apparatus for Drying Straw Boards.—Wm. H. Severson, Cohoes, N. Y.:

I claim, First, In dryers for treating straw boards and other articles to be dried, the use of stationary drying vessels, substantially like that shown at E, with hinged pressers, whose sides are flexible and porous, or open, substantially as above described.

Second, I also claim the hinged pressers, composed of adjustable frames, and flexible porous sides, D, distended on said frames, constructed and operating substantially as above described.

50,281.—Mill Roller.—W. H. Seymour, Ravenna, Ohio:

I claim the herein-described roller, for the purposes set forth, as a new article of manufacture.

50,282.—Locomotive Car.—Henry F. Shaw, West Roxbury, Mass.:

I claim so shaping and arranging the gear wheel, M, of the crank shaft, N, and the gear wheel, L, of the truck-wheel axle, that the one may turn horizontally about the other, substantially as set forth, and for the purpose described.

50,283.—Transmitting Motion.—Henry F. Shaw, West Roxbury, Mass.:

I claim, First, Transmitting motion from shaft to shaft when at an angle with each other, by means of the slotted connecting rods, J K, and elongated cranks, d e, or their equivalents, substantially as described.

Second, Giving motion to the driving wheels of a locomotive dummy engine, or street steam railway car, by means of the vertical crank shaft, A, provided with the elongated cranks, d and e, and the slotted connecting rods, J and K, or their equivalents, arranged and operating substantially as described.

Third, Passing the vertical driving shaft, A, through the center, on which the truck frame turns, substantially as described.

50,284.—Duplicating Deflector for Photographic Purposes.—David Shive, Philadelphia, Pa.:

I claim the deflector, A, arm, B, and clamp, C, constructed and arranged so as to operate, when applied to a camera, substantially as and for the purpose described.

50,285.—Ventilating Device for Hats.—Wm. Smith, Philadelphia, Pa.:

I claim, First, The frame, A, constructed and adapted for being secured within a hat, substantially as and for the purpose specified.

Second, The combination with the said frame of the catch, e, pin, n, and elastic bands, m, for securing the frame in its position, substantially as set forth.

50,286.—Process for Cooling Air.—D. E. Somes, Washington, D. C.:

I claim a portable air cooler, when made with tubes, or their equivalents, as described and used, for the purpose set forth.

50,287.—Coupling for Shafts of Boring Tools.—Job B. Stockton, Oil City, Penn.:

I claim, in fastening drilling tools on their rods, and in securing the couplings of drilling rods, locking the parts to each other by means of a screw inserted radially through the walls of the outer part a half of the coupling so as to intersect the place of the joint, substantially as described.

50,288.—Pill Machine.—Daniel J. Tittle, Albany, N. Y.:

First, I claim the arrangement of two pairs of grooved rollers at right angles to each other, so that the strips of pill material delivered from the first will be in position for being passed into the second pair, as set forth.

Second, I claim the mode of fitting the scrapers, m u v, each upon a cross shaft, with a spring to keep the scraper off the roller, but which will yield when the screws are applied to press the scraper to the rollers for cleaning the same as specified.

Third, I claim the bar, l, and bed, q, in combination with the rollers, f and g, and bed, r, for causing the delivery of the cylindrical strips of pill material from the rollers, f g, upon the bed, r, in the proper position for passing them to the next pair of rollers, as set forth.

Fourth, I claim an incline, 3, combined with a pair of grooved rollers, and operating as specified, to give a rotary movement to the strip of pill material as it passes in between the rollers, as set forth.

Fifth, I claim the combination of the incline, w, and grating, x, with the grooved rollers, s, and t, for receiving the pills as they are delivered from said rollers, and causing them to continue to revolve in the direction before acquired, while passing down the inclined, w, and over the grating, x, for separating the imperfect pills, as set forth.

50,289.—Combined Shirt and Braces.—William H. Towers, New York City:

I claim a shirt provided with straps, intended to take the place of suspenders, substantially in the manner above described and for the purpose set forth.

50,290.—Curd Cutter.—Christopher Wadsworth, East Livermore, Me.:

I claim a machine for cutting curd, as herein described, both the slicers and squares in combination.

50,291.—Dental Operating Chair.—James O. Whitcomb, New York City:

I claim the base, a, stand, B, in combination with the ring, y, provided with bearings for the nut wheels, b b' b'' b''', and bevel wheels, a and c, as herein described and shown.

I claim the chambered ring, G, provided with the leather or other frictional material, in combination with the ball, A, clamp ring, p p, rod, 2, eccentric or cam, M, and lever, g, as herein described and shown.

I claim the cams, m, when attached to the rod, h, and operating on the pins or studs, f, as herein described and shown.

I claim the manner of arranging and adjusting the vertically and horizontally sliding bars, s and l, in combination with their respective grooves, guide, and clamp screws, as herein described and shown.

I claim the segment, g, when attached to the plate, 6 and operated by the screw, n, and milled head, D, or its equivalent, as herein described and shown.

50,292.—Sawing Machine.—Orsamus A. White and Isaac W. Bostwick, Norwalk, Ohio:

First, the combination and arrangement of lever, G, lever, B B', and pulley, e, and cord, E, operating substantially in the manner and for the purposes specified.

Second, The combination and arrangement of the guide arm, A, lever, H, pulleys, d d, and cord, F, operating substantially in the manner and for the purposes specified.

[This invention consists in combining or arranging a shaft with a horse power, and also arranging the pitman of the latter in such a manner that both a reciprocating and a circular saw may be driven by one and the same horse power, or either driven separately as desired.]

50,293.—Apparatus for Cooling Malt Liquors.—Francis L. Wissmann, Philadelphia, Pa.:

I claim the described improvement in apparatus for cooling malt liquors, consisting in the use of the corrugated pipes, A A, of a flattened or oval section, and otherwise arranged as and for the purpose specified.

I also claim the laterally zig-zagged or undulated distributing strips, a a, whether used in connection with the described corrugated pipes or with any other form of tubes, as and for the purpose described.

50,294.—Steam-warming Apparatus.—Chas. A. Wilson, Cincinnati, Ohio:

First, I claim the provision of the manifold, F, having the auto-

matic air vent, G g g', or its equivalent at its upper part, and the water receptacle, I, at its lower part, substantially as and for the purpose set forth.

Second, The provision in the return pipe, H, of the diaphragm, h, and valve, I, so arranged as to open and close automatically by the alternate action of the back pressure of the steam and the forward pressure of the water of condensation, the latter being completely emptied at each discharge, substantially as set forth.

Third, In the described combination, with the tank, K, pipe, L, water discharge valve, M, ventage, N, and air-discharge valve, P, or other equivalents, I claim the provision of the elongated float, Q, arranged and operating as set forth.

50,295.—Kettle for Evaporating Sorghum Sirup, Etc.—Elmer Woodruff, Grand Rapids, Mich.:

First, I claim a cover for kettles, having the general construction and arrangement herein described and for the purposes specified.

Second, In combination with the above, the pan having supporting legs or ridges, substantially as and for the purpose specified.

Third, Forming a door in the side of the cover of the kettle, through which the pan can be placed in or removed from the kettle, substantially as described.

[This invention consists in a novel construction of the top portion and sides of kettle covers, used for the boiling and evaporation of saccharine substances, etc, whereby all the vapors arising from the boiling liquid in the kettle, and condensed upon the interior of its cover, is conducted therefrom to the outside of the cover, while, at the same time, the free escape of such vapors as does not condense is allowed, the advantages of which are obvious to all.]

50,296.—Process for Amalgamating Gold and Silver.—John N. Wyckoff, New York City:

I claim the within-described process of separating gold and silver from the adhering impurities, by mixing the whole with a solution of chloride of sodium, confining it together with mercury within suitable containing vessels, and thereby the action of heat commingling the chloride of sodium and mercury throughout the entire body of auriferious and argentiferious substances, substantially as set forth.

50,297.—Sewing Machine.—Francis D. Ballou, Abington Mass., assignor to Alfred B. Ely, Newton, Mass.:

First, I claim automatically controlling the throw of the needle in sewing materials of varying thickness, by the presser foot, substantially in the manner and for the purpose set forth.

Second, The combination of a needle lever with a presser foot, substantially in the manner and for the purpose set forth.

50,298.—Hand Pegger.—J. H. Brown, Boston, Mass., assignor to Alfred B. Ely, Newton, Mass.:

I claim driving the peg by the reaction of a spring, compressed by the same below that makes the peg hole.

50,299.—Button-hole Sewing Machine.—Emil Cajar (assignor to himself and John H. Thieling), New York City:

First, I claim the method herein described of producing a stitch, such as shown in figures 9 and 10, composed of two threads passing through the loop of the needle thread in opposite directions, and being interlaced with said loop, by mechanism substantially such as herein set forth, or by any other equivalent means.

Second, The use of an L-shaped feeder, in combination with a sewing mechanism, composed principally of an eye-pointed needle, a revolving hook, and an oscillating hook, and otherwise constructed and operating substantially as and for the purpose described.

Third, Imparting to the feeder, M', of a sewing machine, in addition to its ordinary rising and falling motion and to its ordinary rectilinear reciprocating feed motion, an oscillating or circular motion, by means substantially such as herein described or any other equivalent means for the purpose specified.

Fourth, Imparting to the feeder, M', of a sewing machine, in addition to its ordinary rising and falling motion and to its ordinary rectilinear reciprocating feed motion, a reciprocating motion acting conjointly with and in aid of the other motions to effect both a lateral as well as a forward feed of the cloth in the formation of each single stitch, by means substantially as herein described or by any other equivalent means, for the purpose set forth.

50,300.—Folding Bedstead.—John H. Durand (assignor to himself and James Harrison), Kalamazoo, Mich.:

I claim the lazy tongs, G G, when connected to the head and foot of the bedstead and to a central post, E, substantially as and for the purpose specified

[This invention consists in constructing a folding bedstead by arranging a system of levers, commonly called lazy tongs, underneath the bed frames, which latter is made in three parts, two of which, as well as the lazy tongs, are hinged to a central support in such manner that when the foot and head of the bedstead are shoved together the two end parts of the frame will be thrown upward, carrying with them the bed and bedclothes.]

50,301.—Holder for Fruit Jars.—Charles G. Imlay, (assignor to himself and C. C. Lathrop), Philadelphia, Pa.:

I claim the holder, A, with its feet, b, constructed and adapted for the reception of preserving jars, as described, so that the jars may be maintained free from contact with the bottom of the vessel or oven in which they are heated.

50,302.—Gas Burner and Stop Cock.—Edward Jones (assignor to himself and E. J. Davenport), Boston, Mass.:

First, I claim the combination of the gas burner and stop cock, in the manner and for the purpose set forth, substantially as described.

Second, In my combined gas burner and stop cock I claim making the disks or moving surfaces of contact, of a composition of tin and antimony, or some metal equivalent, adapted to offer greater resistance to the corrosive action of the gas than that of which the rest of the apparatus is composed.

50,303.—Box Opener.—M. D. Lawrence (assignor to himself and G. K. Fox), Springfield, Mass.:

I claim the combination of the part, A, having the projections, a b and l, and stop pin, g, attached with the part, B, having the nail set, G, and projection, k, attached, these parts being combined and operated in the manner and for the purpose herein set forth.

50,304.—Cut-off Valve.—Wm. McClintock (assignor to himself and G. G. Lobdell), Wilmington, Del.:

I claim the arm, B, with its slots, a and V, formed substantially as described, secured to the valve spindle, and combined with the within-described operating devices, or their equivalents, substantially as and for the purpose set forth.

50,305.—Gardening Implement.—Roger W. Porter, Nashua, N. H., and Jacob A. Spaulding, Hudson, N. H., assignor to Roger W. Porter, Nashua, N. H.:

We claim the fork, A, hoe, B, projection, E, latch, F, and pin, d, when these several parts are arranged in relation to the shank, C, as and for the purpose specified.

50,306.—Lifting Jack.—H. S. Shepardson (assignor to H. S. Shepardson & Co.), Shelbourne Falls, Mass.:

I claim, in combination with the permanent portion, B and the movable portion, C, of the jack, the toothed arc, D, and swinging toothed arm, F, operating together for the purpose and in the manner substantially as herein described and represented.

50,307.—Water Meter.—H. S. Walcott, Boston, Mass., assignor to James D. Sumner, Lexington, Mass.:

I claim the water wheel, S, constructed as specified, when arranged in combination with its wheel box and pipes, A and B, as herein described and for the purposes set forth.

I also claim, in combination with the above, the counter, I, the indicator, K, with the case, M, when arranged as herein described and for the purposes set forth.

50,308.—Drawers.—James Ware (assignor to himself and C. Y. Ward), New York City:

I claim inserting in the bottom of a pair of drawers a gore-shaped piece of fabric, having an elastic band, inserted in the same, for the purpose herein specified, a pair of drawers thus made constituting a new article of manufacture.

[This invention consists in inserting a gore in the legs of the drawers, which is made to extend down to the bottoms thereof, and in inserting in the bottom of said gore an elastic band for drawing or gathering up the bottom of the drawers, so as to make them fit snugly to the leg or ankle of the wearer.]

50,309.—Railroad Chair.—H. W. Warner (assignor to himself, Franklin J. Pratt and Edmund W. Russell), Greenfield, Mass.:

I claim, in combination with the beveled end rails, C C, the railroad chair, constructed with the corresponding beveled or inclined surfaces, d d, for the purpose of bridging and gradually breaking the joint between the rails, for the purpose set forth.

In combination with the back piece, B, I claim the projection, b, for the purpose of bracing and strengthening the back piece.

I claim a railroad chair constructed with the back piece, B, inclined surfaces, d, brace piece, b, and bed plate, A, substantially as described and for the purpose set forth.

50,310.—Lamp Cleaner.—Robert White, Kingston, C. W., assignor to Furnalds & Clark, New York City:

I claim the the combination of the thumb piece, D, tubular slide, B, and elastic ribs, b b b, the latter being formed at each end with eyes or loops by which they are hinged at their upper ends permanently to the handle, A, and at their lower ends to the slide, B, all as herein specified.

50,311.—Bobbin Holder for Spinning.—Edward Wright (assignor to John Goulding), Worcester, Mass.:

First, I claim a bobbin holder, constructed and operating as above described.

Second, Making the bobbin holder by punching out the metal to form the spring bars, a, substantially as set forth.

Third, The combination with the bobbin holder, C, of the expansible band, E, substantially as set forth.

50,312.—Handle Attachment to Small Arms.—Edward Charlesworth, London, England, assignor to Chas. P. Button, New York City:

I claim the handle or safety elevator above described, for the purposes to which it is applicable, as above set forth, in connection with a gun constructed without the ordinary stock or shoulder rest.

50,313.—Mode of Keeping Gunpowder.—James Gale, Jr., Devonshire Terrace, England. Patented in England, June 27, 1855:

I claim the combining fire-dry unexplosive powder with gunpowder, and in separating the fire-dry powder from the gunpowder when it is required for use, substantially as her in described.

50,314.—Telegraph Cable.—William Peter Piggott, London, England.

First, I claim the method of giving a static charge to a cable, and the means by which this is accomplished, as is set forth, and the manner in which I construct my generators, and which are equally capable of being used either on land or submerged in sea or other water, for telegraphs, and which may be used for other purposes.

Second, The application and use, to and in the transmission of, electric signals of statically charged cables, constructed and worked in the manner hereinbefore described.

Third, The combination in an electric cable of two wires or series of wires of opposite electrical denomination, one of such wires or series of wires being connected with earth at each end by corresponding earth plates, while the other wire or series of wires is connected to a galvenometer or receiving instrument, which is itself connected with earth by a corresponding earth plate.

Fourth. The combination in an electric cable of two or more wires or wire strands of one electrical denomination, connected through a galvanometer or receiving instrument with earth, and of a wire core or covering of opposite electrical denomination, in permanent connection with earth at each end, as hereinbefore described.

Fifth, The application of my ganglions to old or damaged cables of the ordinary construction, for the purpose of working the same by the aid of induced electricity, in the manner hereinbefore described.

50,315.—Manufacture of Artificial Stone.—Frederick Ransome, Ipswick, England. Patented in England, April 9, 1861:

I claim the manufacture of artificial stone by mixing sand, chalk or clay, with or without other matters, with a soluble silicate, which, after molding or plastering, is rendered insoluble, substantially as herein described.

50,316.—Manufacture of Artificial Stone.—Frederick Ransome, Ipswick, England. Patented in England, Feb. 24, 1864:

I claim the treatment of artificial stone, produced according to my previous patent, by employment of a solution of carbonate or bicarbonate of soda, or equivalent salt, to decompose the excess of chloride of calcium, or equivalent salt, and to produce an insoluble substance within the pores of the artificial stone, substantially as herein described.

50,317.—Fabric for Skirt Lining and Binding.—Charles Spannagel. Barmen, Prussia. Patented in England, Feb. 8, 1865:

I claim the herein-described skirt bordering and binding as a new article of manufacture, when combined together, in the manner and for the purpose substantially as set forth and specified.

50,318.—Device for Arranging Tapes, Ribbons and Threads for Use.—Marcus Brown Westhead, Manchester, Eng.:

I claim the application of an elastic slip or drag for the purposes above set forth.

[The object of this invention is to make up tapes, ribbons and other such narrow fabrics or thread in such manner that the consumer may be able to unwind or rewind them and retain the coils in a compact form.]

50,319.—Puddling Furnace.—John Williams, Montreal, C. E.:

First, I claim the novel arrangement in a puddling furnace of a blind grate with the ordinary grate, together with the combination of slide doors, trap doors, tewel holes and air chambers, whereby for all the fuel consumed in the blind grate the benefit is received into the body of the furnace on the iron, with much less of the fuel passing up the chimney than in the ordinary furnaces.

Second, In the different grates I claim the introduction of the hap doors for letting the ashes, cinders, etc., fall into the external ashpit, and thus save the hauling out of ashes when the furnace is in opera ion, thereby effecting a saving in time.

Third, I claim the peculiar arrangement of water boshes, whereby water may be employed without the danger of explosion from the generation of steam.

[By the use of this improved puddling furnace a tun of iron can be made with one-third less fuel than by the ordinary furnaces now in use, and at the same time with about one-half of the cement or iron ore for lining the furnace, turning out also a better class of iron in less time.]

REISSUES.

2,079.—Mowing Machine.—Rufus Dutton and Richard L. Allen, New York City, assignees by mesne assignments of Rufus Dutton. Patented March 15, 1864:

First, We claim changing the cutting apparatus from front to rear and from rear to front of the wheel of the machine, by means of detaching and reversing the parts of the gear casing, C D, draught rod, C', and cross bar, A, substantially as set forth.

Second, Bending the cross bar, A, substantially as described, for the purpose of depressing the end of the casing, together with the crank shaft in rear-cutting machines, and elevating the same in front-cutting machines, substantially as set forth.

Third, The construction of the draught rod, C', with a bend or curve at one end, as described, whereby such rod is adapted, on being reversed for use, either in front or rear-cutting machines, substantially as and for the purposes set forth.

Fourth, So attaching the line of draught in harvesting machines as to counteract the tendency of the gear to rotate the frame on the axle, and also prevent the shoe rising from the ground in rear, cutting and pressing or riding upon the ground in front-cutting machines, substantially as set forth.

Fifth, In machines having two driving or supporting wheels, and also a hinger, finger bar and loose pole, and in which the driver's seat is controlled by the pole or shafts, instead of being controlled by the frame of the machine, the frame of the molding being also supported directly from and by the axle, and not from the pole, attaching the draft rod or chain to the shoe, or to such part of the frame as receives an upward and downward motion from the shoe as it passes over uneven ground, the whiffletree or evener to which the forward end of the draft rod or chain is attached being so connected to or supported from the pole or shafts that it can have a forward and backward movement as the shoe rises and falls, for the purposes set forth.

2,080.—Mechanism for Sealing Boiler Tubes.—P. Eldredge Garvin, Philadelphia, Pa. Antedated March 22, 1865. Patented Aug. 8, 1865:

I claim the combination of the revolving cutter, E, the stationary guide and feeding screw rod, D, and the centering draught dog, H, as and for the purpose as herein specified and described.

2,081.—Auger.—Russell Jennings, Deep River, Conn. Patented Sept. 30, 1865:

I claim the projecting of the floor lips in advance of the cutting spur, when said cutting edges are on parallel lines not passing through the axis of the auger, and are horizontal on their cutting line, as and for the purposes substantially set forth.

2,082.—Steam Boiler.—H. C. Sergeant, Columbus, Ohio. Patented Aug. 22, 1865:

First, I claim the combination of the metal cylinder or casing around the fire surface, with the fire box and reservoir for a body of water upon the crown sheet.

Second, I also claim the combination of the fire flue and casing around, when so arranged as to receive the water from the crown sheet and convey it upward in contact with the flue.

Third, I claim so arranging the casing around the fire surface of boilers as to allow the steam to come in contact with one side of the casing, while the current of water is in contact with the other side, substantially the same as specified in the foregoing specifications.

EXTENSIONS.

Steam Engine.—Frederick P. Dimpfel, Philadelphia, Pa. Patented July 1, 1851. Reissued Feb. 21, 1865. Extended July 1, 1865:

I claim, First, The means herein described for connecting the steam piston of a steam engine with the crank thereof, said means consisting of a piston rod, fixed cross head, side bars, forked connecting rod and belts, or the equivalents thereof, the several devices being arranged and operating substantially as herein set forth, in such manner that the cross piece of the connecting rod which is placed transversely to the crank shaft shall be on opposite sides of the axil line of said shaft, at opposite extremities of the stroke of the piston.

Second, The forming of the eduction and induction chambers in cylinder heads of steam engines, and furnishing them respectively with supply and exhaust valves, substantially in the manner and for the purpose described.

Third, The forming of two steam chambers in one or both heads of a steam-engine cylinder, in combination with induction and eduction steam pipes, and with puppet or other valves, in such manner as that a large portion of the steam shall be saved which is lost or wasted in the nozzles or steam ways of engines, as ordinarily constructed, substantially as described.

Fourth, The removable chambered cylinder head, in combination with the extension chambers, u u, and steam pipes, r r, connected to the latter, substantially as and for the purposes described.

Fifth, The manner substantially as described, of applying the induction and eduction valves with their respective chambers to steam cylinders, for the purpose set forth.

Reaping Machine.—Wm. H. Seymour, Brockport, N. Y. Patented July 8, 1851. Reissued (A) May 31, 1864. Extended July 3, 1865:

I claim, First, The combination in a harvesting machine of the cutting apparatus, to sever the stalks, with a reel and with a quadrant-shaped platform located in the rear of the cutting apparatus; these three members being and operating substantially as set forth.

Second, The combination in a harvesting machine of the cutting apparatus, with a quadrant-shaped platform in the rear of the cutting apparatus, a sweep-rake mechanism for operating the same, and devices for preventing the rise of the rake teeth, when operating on the grain, these five members being and operating substantially as set forth.

Reaping Machine.—Wm. H. Seymour, Brockport, N. Y. Patented July 8, 1851. Reissued (B) July 10, 1860. Extended July 3, 1865:

I claim the combination of the arm, rod or lever, which carries a vibrating sweep rake, with a guide rod, which forms a movable fulcrum for the rake head, substantially as described, for the purpose set forth.

Reaping Machine.—Wm. H. Seymour, Brockport, N. Y. Patented July 8, 1851. Reissued July 10, 1860; again reissued (C) May 7, 1861. Extended July 3, 1865:

I claim a quadrant-shaped platform, arranged relatively to the cutting apparatus, substantially as herein described, for the purpose set forth.

Processes of Bleaching Ivory.—Ulysses Pratt, Deep River, Conn. Patented Jan. 6, 1852. Antedated July 6, 1851. Extended July 4, 1865:

I claim the improvement in the process of bleaching ivory, as set forth in the specifications; i. e., the raising up of one edge of the piece of ivory above the plane of the frame which supports it, and sustaining it in its place, in the manner described.

Fire-proof Safe.—Lewis Lillie, Troy, N. Y. Patented July 15, 1851. Extended July 11, 1865:

I claim the combination of wrought and cast iron, the same forming a safe, in the manner and for the purpose substantially the same as described.

Securing Pinions, Etc., of Watches in Lathes.—J. M. Bottum, New York City. Patented July 15, 1851. Reissued July 8, 1856. Extended July 12, 1865:

I claim the employment of adhesive cement for screwing staffs and pinions of watches, and like articles of small dimensions, for lathe operation, in combination with a chuck, A, having a female center, a, therein, either with or without the tube, B, or its equivalent, as described and set forth, or any device, substantially the same.

Printing Press.—George P. Gordon, Brooklyn, N. Y. Patented Aug. 5, 1851. Reissued July 31, 1860. (No. 1,021.) Extended July 20, 1865:

First, I claim a bed vibrating to and from the impression, in combination with a rocking platen, rocking to and from the impression, for the purposes herein set forth, substantially as described.

Second, I claim rocking the inking-roller arms or frame upon a center, so that the inking rollers may pass and repass over the form of types for each and every impression, whether said rocking frame be constructed in the precise manner described, or in some equivalent way, to produce a like result.

Third, I claim the bearers, or their equivalents, in combination with the rocking inking roller arms or frame, for the purpose of passing and repassing the inking rollers over the type, or form, in a line parallel with the face of the type, when each working roller frame shall carry the inking rollers forward and backward over the type for each and every impression.

Fourth, I claim vibrating the bed from the point of its receiving the inking rollers to the point of impression, as described.

Fifth, I claim the rocking inking-roller arms or frame, in combination with a vibrating bed, substantially as herein specified.

Sixth, I claim constructing a printing press with a rocking platen, so that the pressman, while feeding and driving the press, may stand directly in front of said press for such purpose, and be enabled, without changing his position, to see the face of such rocking platen as it rocks or turns toward him for the reception of the sheet to be printed; the face of the type or form as it moves to and from the impression; the ink-distributing cylinder, or its equivalent, from its being placed at the top of the press; and the inking rollers when inking the type or form—thereby enabling said pressman to detect any imperfection in the working of these parts of the press—all substantially as herein set forth.

Printing Press.—George P. Gordon, Brooklyn, N. Y. Patented Aug. 5, 1851. Reissued July 31, 1860. (No. 1,022.) Extended July 20, 1865:

First, I claim supporting upon a center or centers a platen which shall rock or turn between the point necessary for the reception of the impression and the point necessary for the reception of the sheet to be printed, when the face of such working platen shall stand out of a horizontal position, or at an angle from a horizontal position, at the time the impression is given, substantially as herein set forth and for the purposes described, whether the same be accomplished in the precise manner specified or in some equivalent way.

Second, I claim the frisket grippers, or their equivalents, for relieving the sheet from the type, in combination with a rocking platen.

Third, I claim giving to a rocking platen, when receiving the sheet to be printed or when receiving the impression, a period of rest during the continued motions of other parts of the press.

Process of Forming Stitches by Machinery.—Allen B. Wilson, Waterbury, Conn. Patented Aug. 12, 1851. Reissued Feb. 28, 1860. (No. 913.) Extended July 24, 1865:

I claim, First, In combination with an eye-pointed needle carrying one thread, a hook properly shaped and moved, and a bobbin supporting and giving off a lower thread, the combination as a whole being substantially such as specified, and acting to make stitches under the mode of operation, substantially as hereinbefore described.

Second, The combination of a hook so shaped and moved as to spread a loop sufficiently to surround a bobbin with a bobbin acting as specified, the combination being substantially such as recited hereinbefore, and acting so that a loop is seized, spread and released with a bobbin thread inclosed in it, and then drawn up tight by the hook.

Third, I claim a revolving hook so shaped as to operate substantially in the manner specified on loops of needle thread.

Fourth, I claim a hook so shaped and moved as to spread a loop substantially in the manner set forth, in combination with an eye-pointed needle actuated by an eccentric or equivalent motion.

Fifth, I claim feeding the material to be sewed step by step by an instrument operating and constructed substantially as described, for the purposes specified, in conjunction with a presser foot or surface governed by a yielding force, such as described.

Sixth, I claim a spring or yielding clamping surface, when combined with another surface so as to grasp cloth between them, and also with a feeding instrument which is out of contact with the cloth when it is thus clamped, the operation being such that the cloth remains clamped, substantially in the manner and for the purposes specified, while the feeding instrument is out of contact or engagement with the cloth.

Seventh, I claim arranging a hook that operates substantially in the manner specified in such relative position to a table for supporting cloth and to an eye-pointed needle that the former shall extend loops of needle thread in planes perpendicular, or nearly so, to the plane of the cloth or material to be sewed, substantially as specified.

And, Lastly, I claim a horizontal shaft arranged beneath the platform or table of the machine, by which are actuated the needle, the hook and the feeding instrument, in combination with a hook which moves in a vertical plane, or nearly so, the combination being substantially such as described.

Process of Forming Stitches by Machinery.—Allen B. Wilson, Waterbury, Conn. Patented Aug. 12, 1851. Reissued Feb. 28, 1860. (No. 914.) Extended July 24, 1865:

I claim, First, That there are certain periods in the formation of the seam, two loops of needle thread below the cloth at the same time, one being extended and the other being drawn up, substantially in the manner and for the purpose specified; and

Second, That the stitches are tightened or drawn up by the extension of the next succeeding loop, as distinguished from a drawing up of the stitch by the motion of the needle or needle bar.

Sewing Machine.—William H. Akins, Dryden, N. Y., and Jacob D. Felthousen, Michigan City, Ind. Patented Aug. 5, 1851. Reissued April 11, 1865. Extended July 29, 1865:

I claim, First, The combination of a needle bar of a sewing machine with a spring to draw up the needle after the stitch is formed, for the purpose of tightening the stitches, substantially as set forth.

Second, The combination of the stitch-forming mechanism and spool spindle with an intermittent thread-gripping mechanism located between the spool spindle and the place where the stitch is formed, substantially as set forth.

Third, The combination of the needle bar and shuttle driver of a sewing machine with mechanism for operating them in such manner that the shuttle is caused to enter between the needle and its thread while the needle is arrested, after having made a short retrograde movement.

Fourth, The combination in a sewing machine of a stitch forming mechanism with a cylindrical rest, for the purpose of supporting articles or curved or tubular form, substantially as set forth.

Fifth, The combination of a toothed feeding instrument with reversible driving mechanism, substantially as set forth.

Sewing Machine.—Isaac M. Singer, Yonkers, N. Y. Patented August 12, 1851. Reissued Oct. 3, 1854. Extended August 7, 1865:

I claim giving to the shuttle an additional forward movement after it has been stopped to close the loop, as described, for the purpose of drawing the stitch tight, when such an additional movement is given at and in combination with the feed motion of the cloth in the reverse direction, and the final upward motion of the needle, as described, so that the two threads shall be drawn tight at the same time, as described.

I also claim controlling the thread by what I have termed the friction pad between the seam and the bobbin, or any equivalent therefor, substantially as described, and for any or all of the purposes specified.

I also claim placing the bobbin from which the needle is supplied with thread on an adjustable arm, attached to the frame, substantially as described, when this is combined with the carrying of the said thread through an eye or guide attached to and moving with the needle carrier, as described, or the equivalent therefor, whereby any desired length of thread can be given for the formation of the loop, without varying the range of motion of the needle, as described.

And I also claim, in a sewing machine, feeding the cloth or other substance to determine the space between the stitches by the friction of the surface of the periphery of the feed wheel, or any equivalent feeding surface, substantially as specified, in combination with a spring pressure plate or pad, which gripes the cloth or other substance against such feeding surface, substantially as specified and for the purpose set forth.

Machine for Numbering the Pages of Account Books.—John McAdams, Brooklyn, N. Y. Patented Aug. 12, 1851. Reissued Jan. 26, 1858. Extended Aug. 11, 1865:

I claim the mode of arranging and operating the numeral types for printing the pages of the whole book, substantially as herein described, to wit, arranging the types of the several numbers from 1 to the highest number required in a serial order, in one or more continuous lines one behind another, and bringing them up successively and separately to the point of impression, so that the type of each number is independent of all others, and used alone and but once in the paging of the whole book, and all others are out of the way; and this I claim whether the said types are fixed in a chain or chains, or in any other manner by which the same system of operation is obtained.

And I also claim arranging two type chains or continuous lines of type parallel with each other, at a proper distance apart, and with the types in proper serial order, and operating the same simultaneously, substantially as described, to print the numbers of two pages simultaneously on two opposite corners of the same side of the sheet.

And I further claim the arrangement of two pairs of type chains or continuous lines of type, substantially as described, to print the numbers of two pages on each side of a sheet while the sheet is passing once through the machine.

Nut and Washer Machine.—Robert Crichton and James Rees, Pittsburgh, Pa., Executors of Henry Carter (deceased) and James Rees. Patented Aug. 26, 1851. Reissued June 19, 1855. Extended Aug. 14, 1865.

We claim the machine, substantially as herein described, for making nuts, by cutting the blank from a heated bar of iron, punching its eye in a closed die box, pressing it into shape while in the die box and on the punch, and then discharging it, as specified.

Insulator for Lightning Rods.—George W. Otis, Lynn, Mass. Patented Aug. 26, 1851. Extended Aug. 25, 1865:

I claim the insulated support and point for lightning rods, consisting of the insulated point and opening in its shank, the insulating cylinder of glass, with its lip or flange, and the wooden collar for securing the whole to the building, all as described.

Leather-splitting Machine.—Hubbard Harris, Ensfield, N. H., Administrator of Alpha Richardson (deceased). Patented Sept. 16, 1851. Extended Sept. 15, 1865:

I claim, First, Making the gage roller of a leather-splitting machine, with the sectional tubes or friction rollers to be placed on each end thereof, substantially as hereinabove set forth, and for the purpose specified.

Second, I claim combining with the ordinary cast-iron spring plate of a leather-splitting machine, a cast-steel spring plate, forming a double lip spring plate, and fitted thereon so as to be adjustable horizontally, as hereinabove set forth, and so that the front edge of the lower or cast-iron plate, may project under the edge of the knife and hold up the split as hereinabove set forth.

Mowing Machine and Harvester.—Mary Manny, Rockford, Ill., Executrix of John H. Manny (deceased). Patented Sept. 23, 1851. Reissued Jan. 2, 1855. (No. 286). Extended Sept. 22, 1865:

I claim the combination of the bar that supports the cutter with a diagonal lever held down at its inner end, substantially as described, and resting upon the axle of the carriage, as a fulcrum, or upon some other equivalent support, that will perform the function of a fulcrum, whereby the outer end of the cutter bar is held up, substantially as herein set forth

Arrangement of Joints for Attaching Trucks to Harvester Frames.—Mary Manny, Rockford, Ill., Executrix of John H. Manny (deceased). Patented Sept. 23, 1851. Reissued January 2, 1855. (No. 287). Extended Sept. 22, 1865:

I claim the arrangement of a flexible joint in the line of the cutter, or thereabouts, in such manner that the machine will bend freely up and down along this line, to keep the cutter as nearly as may be at a uniform height from the surface of smooth or undulating ground.

Arrangement for Controlling Harvester Cutter.—Mary Manny, Rockford, Ill., Executrix of John H. Manny (deceased). Patented Sept. 23, 1851. Reissued Jan. 2, 1855. (No. 288). Extended Sept. 22, 1865:

I claim controling the flexure of the machine, hinged so that it will bend in the line of the front edge of the cutting apparatus, or thereabouts, by means of an adjustable stop and arm, or their equivalent, in such manner that the cutter will be kept at the proper elevation on smooth ground, will be free to rise and fall, to conform to a gently undulating surface, and will be restrained from descending into furrows or other sudden and narrow depressions, while it will be free to rise to any extent required, for passing over bowlders, stumps, or other like protuberances in its path, substantially as specified.

Machine for Making Nuts, Washers, Etc.—William Kenyon, Steubenville, Ohio. Patented Oct. 14 1851. Reissued March 18, 1856. Again Reissued Feb. 15, 1859. Extended Sept. 27, 1865:

I claim, First, Making nuts for bolts by subjecting the blank of which the nut is to be formed, at a welding heat, to compression between swages or dies in a close die box or matrix, and punching the eye of the nut during the continuance of such pressure, for the purpose of welding up any imperfections in the iron, and giving a symmetrical shape and smooth finish to the nut, and of preventing any injury to the nut which it might suffer by the passage of the punch through it, if it were not thus sustained by the sides of the die box, and forcibly compressed between the dies.

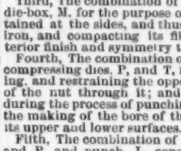
Second, The use of a die box, closed at the sides, for surrounding the nut, and sustaining its sides while it is subjected to pressure, substantially in the manner hereinbefore described

Third, The combination of the compressing dies, P and T, with the die-box, M, for the purpose of compressing the nut while it is sustained at the sides, and thus welding up any imperfections in the iron, and compacting its fiber, so as to give strength as well as exterior finish and symmetry to the nut.

Fourth, The combination of the punch, L, with the die box, M, and compressing dies, P, and T, for the purpose of compressing, confining, and restraining the opposite faces of the nut, during the passage of the nut through it; and thus preventing any injury to the nut during the process of punching; and also for the purpose of insuring the making of the bore of the nut in the proper relative position to its upper and lower surfaces.

Fifth, The combination of the die box, M, the compressing dies, T and P, and punch, L, constructed and arranged substantially as hereinbefore described, for the purpose of making hot pressed nuts at a single operation, by severing a blank from a bar of heated metal, compressing it into shape, and punching a hole or eye through it while under compression, and delivering the finished nut from the machine.

Sixth, Arranging the compressing dies, in relation to the punch, and regulating their relative motion in such manner substantially as hereinbefore described, that any excess of iron in the blank shall be forced into the path of the punch in the compressing dies, thus securing the compression of the nut without risk of damage to the machine.



PATENTS

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In connection with the publication of the SCIENTIFIC AMERICAN, have acted as Solicitors and Attorneys for procuring "Letters Patent" for *new inventions* in the United States and in all foreign countries during the past *seventeen years*. Statistics show that nearly ONE-HALF of all the applications made for patents in the United States are solicited through this office; while nearly THREE-FOURTHS of all the patents taken in foreign countries are procured through the same source. It is almost needless to add that, after *eighteen years'* experience in preparing specifications and drawings for the United States Patent Office, the proprietors of the SCIENTIFIC AMERICAN are perfectly conversant with the preparation of applications in the best manner, and the transaction of all business before the Patent Office; but they take pleasure in presenting the annexed testimonials from ex-Commissioners of Patents.

MESSRS. MUNN & CO.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the office, a marked degree of promptness, skill, and fidelity to the interests of your employers. Yours very truly,

CHAS. MASON

[See Judge Holt's letter on another page.]

Hon. Wm. D. Bishop, late Member of Congress from Connecticut, succeeded Mr. Holt as Commissioner of Patents. Upon resigning the office he wrote to us as follows:

MESSRS. MUNN & CO.:—It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency; and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully, your obedient servant,

WM. D BISHOP.

THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent, free of charge. Address MUNN & CO., No. 37 Park Row, New York.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service which Messrs. MUNN & CO. render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there; but is an opinion based upon what knowledge they may acquire of a similar invention from the records in their Home Office. But for a fee of $5 accompanied with a model, or drawing and description, they have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, etc., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through the Branch Office of Messrs. MUNN & CO. corner of a and Seventh streets, Washington, by experienced and competent persons. Many thousands of such examinations have been made through this office, and it is a very wise course for every inventor to pursue. Address MUNN & CO., No 37 Park Row, New York.

The Patent Laws, enacted by Congress on the 2d of March, 1861, are now in full force and prove to be of great benefit to all parties who are concerned in new inventions.

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners, except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention the Government fee for a caveat is $10. A pamphlet of advice regarding applications for patents and caveats is furnished gratis, on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

INVITATION TO INVENTORS.

Inventors who come to New York should not fail to pay a visit to the extensive offices of MUNN & CO. They will find a large collection of models (several hundred) of various inventions, which will afford them much interest. The whole establishment is one of great interest to inventors, and is undoubtedly the most spacious and best arranged in the world.

UNCLAIMED MODELS.

Parties sending models to this office on which they decide not to apply for Letters Patent and which they wish preserved, will please to order them returned as early as possible. We cannot engage to retain models more than one year after their receipt, owing to their vast accumulation, and our lack of storage room. Parties, therefore, who wish to preserve their models should order them returned within one year after sending them to us, to insure their obtaining them. In case an application has been made for a patent the model is in deposit at the Patent office, and cannot be withdrawn.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

FOREIGN PATENTS.

Messrs. MUNN & CO., are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business they have offices at Nos. 66 Chancery lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. They think they can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through their agency.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

Pamphlets of information concerning the proper course to be pursued in obtaining patents in foreign countries through MUNN & CO.'S Agency, the requirements of different Government Patent Offices, &c. may be had, gratis, upon application at the principal office, No. 37 Park Row, New York, or any of the branch offices.

SEARCHES OF THE RECORDS.

Having access to all the official records at Washington, pertaining to the sale and transfer of patents, MESSRS. MUNN & CO., are at all times ready to make examinations as to titles, ownership, or assignment of patents. Fees moderate.

ASSIGNMENTS OF PATENTS.

The assignment of patents, and agreements between patentees and manufacturers carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO. at the Scientific American Patent Agency, No. 37 Park Row, New York.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by a draft or Postal Order on New York, payable to the order of Messrs. MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row, New York.

REJECTED APPLICATIONS.

Messrs. MUNN & CO. are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of their Washington Agency to the Patent Office affords them rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Their success in the prosecution of rejected cases has been very great. The principal portion of their charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted, are invited to correspond with MUNN & CO., on the subject giving a brief history of the case, inclosing the official letters, etc.

MUNN & CO. wish it to be distinctly understood that they do not speculate or traffic in patents, under any circumstances; but that

they devote their whole time and energies to the interests of their clients.

Patents are now granted for SEVENTEEN years, and the Government fee required on filing an application for a patent is $15. Other charges in the fees are also made as follows :—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

EXTENSION OF PATENTS.

Many valuable patents are annually expiring which might readily be extended, and if extended, might prove the source of wealth to their fortunate possessors. Messrs. MUNN & CO. are persuaded that very many patents are suffered to expire without any effort of extension, owing to want of proper information on the part of the patentees, their relatives or assigns, as to the law and the mode of procedure in order to obtain a renewed grant. Some of the most valuable grants now existing are *extended patents*. Patentees, or, if deceased, their heirs, may apply for the extension of patents, but should give ninety days' notice of their intention.

Patents may be extended and preliminary advice obtained, by consulting, or writing to, MUNN & CO., No. 37 Park Row, New York.

Communications and remittances by mail, and models by express (prepaid) should be addressed to MUNN & CO. No. 37 Park Row, New York

Notes and Queries

T. C. D., of Mass.—Your balloon with masts and sails is quite an old idea.

W. B. H., of Ohio.—It is quite an easy matter to arrange a slide lathe to feed across the face plate. Put a small pulley on a counter shaft over head, and another on the back end of the screw that moves the tool in and out, then put on a belt and go ahead. To cut a scroll you must have some positive arrangement, as gearing belts would slip. Any mechanic can devise a plan in five minutes.

W. B. S., of Ill.—You will find an article on the pressure on a slide valve on page 151, Vol. XII., of the SCIENTIFIC AMERICAN, which will give you all the information you want.

G. L. D., of Conn.—Silver is readily soluble in nitric acid; the two substances combine, forming nitrate of silver, or lunar caustic.

F. J. S., of Tenn.—If water is heated in a close vessel above the temperature of 212°, and then allowed to escape into the atmosphere, it immediately expands into steam, increasing its volume 1,700 fold. In boiler explosions the destruction is due principally to steam thus suddenly formed.

G. E., of Ind.—The admixture of sand with fire clay tends to prevent unequal contraction and cracking under the action of heat; the proper proportions of sand vary with the purpose for which the clay is to be used. Mica is a very infusible mineral, and, in some cases, would, doubtless, be as good, or better, than pure quartz sand, but this could be ascertained only by experiment.

J. G. M., of Conn.—We have had suggestions enough in relation to the cable, unless some one can propose something manifestly of practical value.

T. W., of Pa.—You can only obtain the Patent-office Reports through your Member of Congress. The Commissioner is supplied with but few copies.

T. K., of N. Y.—The question in regard to the rotation of a carriage wheel has been so often discussed in our journal that we do not care to open the subject now. Try the experiment and you will be able to settle the question without our advice.

N. S., of N. Y.—So far as we know, all files are made by the force of a blow upon the surface of the steel. We inquired of a file maker a few days ago why files could not be made by the use of a cutting tool, as you suggest. He thought a good file could not be made in that way, but if you can succeed you will be doing something new so far as our information extends.

J. R. I., of Va.—We should be happy to tell you the value of the contents of the machine shop you are about to purchase if we had any means of knowing. Inasmuch as it is 500 miles from here, that we have never seen it, and don't know what tools there are in it, the chances are that our opinion would not profit you much.

W. H. T., of R. I.—This correspondent wishes to know the best works for a young man to read who wishes to be something more than common. As he has not informed us of the nature of his calling we cannot say. "Bourne's Catechism of the Steam Engine;" "King's Notes on the Steam Engine;" "Silliman's First Principles of Philosophy" are all good works for machinists and engineers.

W. R., of N. Y.—Rosewood is polished by varnishing it and afterward rubbing it down with pumice stone and water. The operation is repeated two or three times. Any wood can be thus polished. Carriages are so treated, and the result is like an enameled surface.

H. H., of Wis.—In regard to the question of two levers, each four feet in length; one having the fulcrum at the end, and the weight one foot from the end; and the other having the weight at the end, and the fulcrum one foot from the end—a clear way of considering the relative power is to let each lever sweep a complete circle around the fulcrum as a center. In both cases the circle described by the weight will be two feet in diameter, but that described by the opposite end of the lever will in one case be six feet in diameter, and in the other eight; and the power is in proportion to the distance passed over.

TO OUR READERS.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and inclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgement of our reception of their funds

INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired

Back Numbers and Volumes of the "Scientific American."

VOLUMES IV., VII., XI. AND XII., (NEW SERIES) complete (bound) may be had at this office and from periodical dealers. Price, bound, $3 00 per volume, by mail, $3 75 which includes postage. Every mechanic, inventor or artisan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding VOLS. I., II., III., V., VI., VIII., IX. and X., are out of print and cannot be supplied.

RATES OF ADVERTISING.

TWENTY-FIVE CENTS per line for each and every insertion, payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published we will explain that eight words average one line. Engravings will not be admitted into our advertising columns, and, as heretofore, the publishers reserve to themselves the right to reject any advertisement they may deem objectionable.

TO SOAP MANUFACTURERS.—PROF. H. DUSSAUCE, Chemist, is ready to give information and advice to manufacturers, and furnish them Processes to make the following Soaps:—Castile, Olive Oil, Tallow, Oleic Acid, Family, Soft, Cocoa and Palm Oils; Transparent, Silicated, White, Colored and Perfumed Toilet Soaps, Soaps by the cold process. Recipes to prepare every kind of Lyes and purify them after having been used. He also furnishes Plans of Soap Factories and Drawings of the Principal Apparatus. He makes out on short notice Analyses of Alkalies, Lyes, Greases, Soaps Etc. Address New Lebanon, N. Y. 1*

WAR DEPARTMENT, ADJUTANT-GENERAL'S OFFICE, WASHINGTON, Sept. 27, 1865.

IN THE CASE OF MAJOR JOHN A. HADDOCK, 12th Regiment Veteran Reserve Corps, Acting Assistant Provost-Marshal General, Western Division of the State of New York, tried before a General Court Martial, which convened at Elmira, New York, May 22, 1865, and at Syracuse, New York, July 6, 1865, for "violation of the 99th article of war," in receiving presents and large sums of money, as bribes, from substitute brokers, to influence his official action; for "violation of the 83d article of war, and conduct unbecoming an officer and a gentlemen," in writing certain communications for fraudulent purposes; also, for "fraud, malfeasance in office, abuse of official powers, complicity with bounty brokers in the Western Division of the State of New York, accepting presents and bribes, proposing to accept presents and bribes, agreeing to accept presents and bribes, being interested pecuniarily in recruiting and filling quotas in the Western Division of the State of New York," the Court sentenced him "to be cashiered and utterly disabled to have or hold any office or employment in the service of the United States, that he pay a fine of ten thousand dollars to the United States, and be imprisoned at such place as the proper authorities may designate until the said fine be paid—the period of said imprisonment not, however, to exceed five years; and in conformity with the 85th article of war, the Court add in and to the said sentence, that the crime, name and place of abode of the said John A. Haddock, to wit: the Town of Watertown, in the State of New York, and punishment of the said delinquent, be published in the newspapers of the State of New York, (from which particular State the said offender came, and where he usually resides," which sentence was duly approved and ordered to be executed.

E. D. TOWNSEND, 1 Assistant Adjutant-General.

BUSINESS OFFERS ARE SOLICITED BY A YOUNG American Engineer, who has had a thorough Scientific and Mechanical Education. Has had several years experience in the practical designing of steam machinery, at the two leading machine shops of this city (references from which will be shown), and is now employed as Inspector of Steam Machinery being constructed for the Government. Can command some capital, and wishes to devote his whole time and attention to business, with a few to partnership. Address H. W. BARLOW, 1* New York City P. O.

PORTABLE STEAM ENGINES.—THESE WORKS have lately increased their facilities for the manufacture of their so popular engines. Prices reduced to a peace standard. Fourteen feet and more of heating surface given to the nominal horse-power. Delivery to the Oil Regions by part navigation much prompter and cheaper than from more eastern points per railroad. Stationary and Propeller Engines with Boilers of the best design made to order. The Stationary Engines have Variable Cut-off worked by Governor. Send for circular before buying. F. WM. RAEDER, 16 17 Ames Iron Works, Oswego, N. Y.

PLATINUM CRUCIBLES AND DISHES—FOR SALE by H. M. RAYNOR, Importer of Platina, No. 748 Broadway, N. Y. Platinum Scrap and Ore purchased. 1*

WANTED—A SITUATION AS MECHANICAL DRAUGHTSMAN. Good references. Address WM. R. BROOKS, 1* Northbridge, Mass.

WHAT MATHEMATICIANS HAVE PRONOUNCED mathematically impossible I have demonstrated to be mathematically certain. Price 15 cents by mail. WM. ISAACS LOOMIS, Martindale Depot, Col. Co., N. Y. 1*

AGENTS WANTED.—LIVE AGENTS WANTED everywhere. If you want employment and a good chance to make money, send your address and receive my circular free by mail. BENJAMIN W. HITCHCOCK, 1 No. 14 Chambers street, New York.

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OFFICE DEPOT COMMISSARY, FORT MONROE, Va., September 21, 1865.

GOVERNMENT SALE OF WHISKY.—SEALED PROPOSALS (in duplicate) are invited and will be received by the undersigned at this depot until 12 o'clock M. on the 13th day of October, 1865, for the sale of one thousand seven hundred and fifteen (1,715) barrels of whisky, more or less, as follows, viz.:—

LOT No. 1.—Consisting of ten hundred and sixty-seven (1,067) barrels of Rectified Whisky, originally inspected in April, May and June, 1864, and January, 1865, containing about forty-two thousand three hundred and forty-five (42,345) gallons. Proposals for ten (10) barrels and upward of this lot will be received.

LOT No. 2.—Consisting of four hundred and sixty (460) barrels of Pure Copper-distilled and Superior Bourbon Whisky, originally inspected in February, 1865, containing about eighteen thousand four hundred and ninety-eight (18,498) gallons. Proposals for five (5) barrels and upward of this lot will be received.

LOT No. 3.—Consisting of one hundred and twenty (120) barrels of Pure Rye Whisky, originally inspected in February, 1865, containing about four thousand eight hundred (4,800) gallons. Proposals for three (3) barrels and upward of this lot will be received.

LOT No. 4.—Consisting of sixty-three (63) barrels Pure Old Rye Whisky, originally inspected in February, 1865, containing about two thousand five hundred and twenty (2,520) gallons. Proposals for two (2) barrels and upward of this lot will be received.

LOT No. 5.—Consisting of five (5) barrels Pure Old Bourbon Whisky, originally inspected June, 1864, containing about one hundred and sixty-three (163) gallons. Proposals for one (1) barrel and upward of this lot will be received.

The whisky was originally selected with great care, and is all pure and of prime quality. The Rectified was designed for issue to the troops in the field, and the Bourbon and Rye for sales to officers, and are equal if not superior to any whiskies now in the market; has all been regaged within the present month, and is in excellent order, packages being of the best quality.

Samples of the whisky can be seen and blank proposals can be obtained at the offices of the following-named officers of the Subsistence Department, viz.:—

Colonel H. F. CLARKE, A. D. C. and A. C. G. S., New York.
Brevet Brigadier-General THOS. WILSON, C. S., Baltimore, Md.
Major GEORGE BELL, C. S., Washington, D. C.
Captain THOMAS C. SULLIVAN, C. S., Richmond, Va.
Captain E. D. BRIGHAM, C. S., Boston, Mass.
Captain J. B. WIGGINS, C. S., Philadelphia, Pa.

The Government reserves the right to withdraw any or all of the above lots, and to reject any proposals deemed too low.

Payment to be made in United States currency within ten (10) days after notification of acceptance of bid and prior to delivery of the property.

A guaranty equal to one-half the amount proposed for must accompany the bid, signed by two (2) responsible parties.

When removing the whisky, purchasers will provide their own transportation, and the Government will load the vessels free of wharfage, dockage, or labor.

Bidders are invited to be present at the opening of their proposals. Brevet Brigadier-General Joseph Roberts, U. S. A., commanding at Fort Monroe, Va., or some other officer of rank, will be present at the opening of bids to represent absentees.

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Chouteau, Harrison & Valle, Leclede Rolling Mill, St. Louis. 1 tf

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August 10, 1865. 13 tf

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Fig. 1

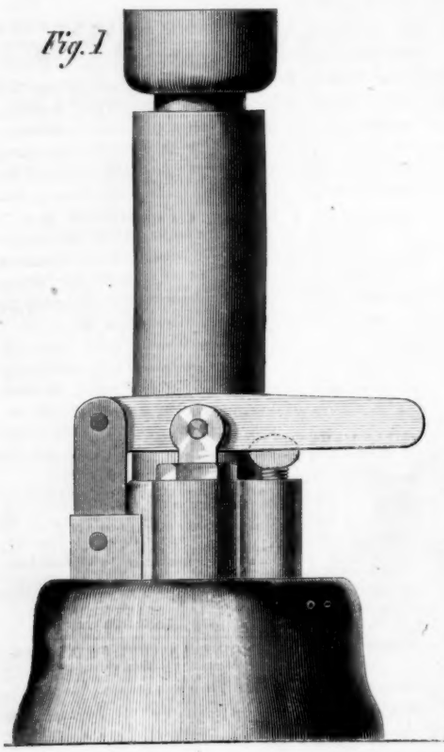
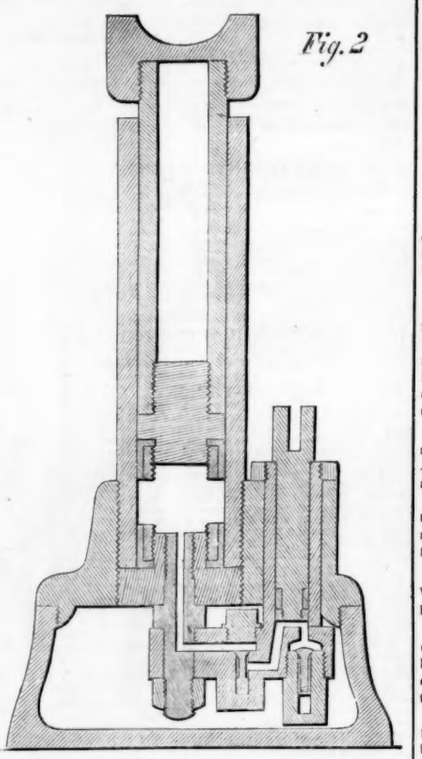


Fig. 2



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plain themselves very clearly as regards the construction.

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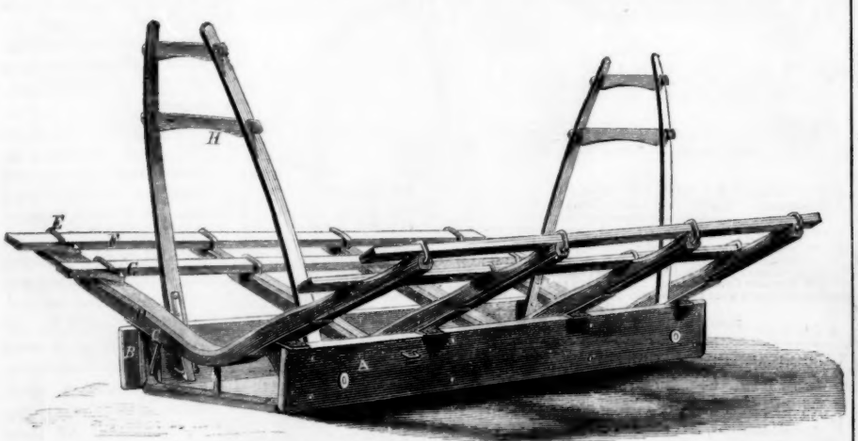

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with precision, by means of the thumb screw near the lever, is apparent, as under the old plan of pressing upon the valve with a pin and a short lug on the bottom of the handle, when reversed, is very liable to produce accidents by its sudden motion, when under great weight; it is strong, compact, not liable to get out of order, and cheap, and it is so constructed that, should one part of it be broken by any acci-

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